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THE PSYCHOLOGY OF IMITATION WITH SPECIAL REFERENCE TO EARLY CHILDHOOD

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I. *Wide disagreement as to psychology of imitation* (pp. 105–107).
II. *Earliest appearance of imitation: sound making at one month* (pp. 107–109).
III. *Second month: smile responses* (p. 109).
IV. *Early imitation of other movements* (p. 110).
V. *Imitation of the sound of definite words* (pp. 110–112).
VI. *Imitation of movements: six to twelve months* (pp. 112–115).
VII. *The latent period and the effect of repetition* (pp. 115–116).
VIII. *Summary of evidence up to twelve months and suggestions of a theory of imitation* (pp. 116–121).
IX. *Experiments on imitation at twelve months* (pp. 121–126).
X. *Experiments on imitation at two years* (pp. 126–128).
XI. *The importance of the imitatee* (pp. 129–130).
XII. *Primary imitation among adults* (pp. 130–131).
XIII. *Summary of results and conclusions* (pp. 131–132).

I. WIDE DISAGREEMENT AS TO PSYCHOLOGY OF IMITATION.

THE psychology of imitation is in a somewhat chaotic state, partly owing to the ambiguity of the term and partly owing to disagreement as to facts.

Thorndike[1] quotes Kirkpatrick, Stout and others as examples of upholders of a widespread view that "the child makes every gesture that he sees and every sound that he hears": and adds that any who seem to have said that "behaviour witnessed produces identical behaviour by any original potency" "cannot, if possessed of any sense for fact, have meant what they said."

"Sit before an infant," writes Thorndike, "and perform time after time a score of such novel but simple acts as putting your right hand on your head and your left on your right shoulder. He does not in nine cases out of ten do anything more like the act you perform than like any other of the twenty."

En revanche, Drever says: "So much of our own learning is done by way of imitation, so much of the untutored teaching of parents, civilized and savage alike, is based on imitation, so much of the teaching and training of their young on the part of the lower animals rests on the same basis, that it is difficult to believe that Thorndike means to deny that there is an instinctive tendency to imitate, in the sense in which this has always been assumed. If he does, we cannot help regarding his view as an almost incredibly arbitrary distortion, and even flouting, of the facts, in order to support a theory which has not even simplicity to recommend it[1]."

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[1] *Educational Psychology*, I, 110.

Again, J. B. Watson says the analysis of the instinct of imitation has been only 'very superficial,' and quotes Thorndike's treatment as being 'as accurate as any[2]'; on the other hand, J. M. Baldwin describes imitation as the 'controlling impulse' when it does develop[3].

McDougall denies the existence of an instinct of imitation on the grounds that there is no 'common affective state,' no common impulse seeking satisfaction in some particular change of state[4]; that we lack evidence of it in lower animals, and that cases of imitation can be explained in other ways[5]. Thus many cases of imitation can be explained as the result of the gregarious instinct, others can be traced to a general tendency for 'all motor representations' to realize themselves immediately in movement, an admission which it is surprising has not been seized upon by upholders of a 'general imitative tendency,' as giving all they asked; for they need not necessarily tie themselves down to an 'instinct' in McDougall's sense as implying strong conative urge and a specific emotion.

It is well, however, that they did not claim the authority of McDougall in their support, for in his *Outlines* McDougall shows a much more critical attitude towards this ideo-motor theory, regarding it as "an exaggeration and distortion of the truth that every cycle of mental activity tends naturally to express itself in bodily movement[6]."

More recently Koffka has stated that animals and children only imitate 'what they understand[7],' a more sweeping assertion than that of Kohler, who is careful to say that "relatively *complex* proceedings seen *without a trace of insight* are not imitated[8]."

Those psychologists I have referred to so far are, I think, fairly representative of various views in imitation. All would agree that there is such a thing as *purposive* imitation, when an individual (A.) sees another (B.) secure, by a certain method, an effect which A. also desires, and when A. proceeds to imitate the method in order also to bring about his own purpose. This is simply imitation of a means, which is comprehended as a means, to an already desired end: 'reflective imitation' I should prefer to call it (with Lloyd Morgan) in order at this stage not to exclude all purpose (in any sense of the word) from other forms of imitation.

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[1] *Psychology of Education*, p. 87.

[2] *Psychology from the Standpoint of a Behaviourist*, p. 280.

[3] *Mental Development in the Child and the Race*, p. 125.

[4] *Social Psychology*, 9th edition, p. 103.

[5] *Outlines of Psychology*, pp. 173 ff.

[6] *Ibid.*, p. 290.

[7] *The Growth of the Mind* (Eng. trans. by R. M. Ogden), p. 318. Italics mine.

[8] *The Mentality of Apes* (Eng. trans. by E. Winter), p. 220.

It is in reference to the existence of a more non-reflective 'impulse' or 'instinctive' tendency to imitate (*primary* imitation I propose to call it) that differences of opinion arise—whether there is a general tendency, or specific tendencies, and if so, of what nature. This is obviously a question which can only be answered by a thorough study of the behaviour of children in the earliest years.

I give below the results of observations and tests extending over fifteen years on my own children, from their earliest days, quoting all my notes on anything of the type described as 'imitation' by various writers, though some might include certain of these phenomena under 'suggestion,' 'innate sympathetic response,' etc.

My boys are referred to as A., B. or C., and my daughters as X. and Y., alphabetical order not to be taken as signifying order of age. E. indicates their mother. When no letter is specified the observation refers to B.

D. stands for day, showing the age of the child referred to at the time of the observation. The observer was myself, unless otherwise stated[1].

II. EARLIEST APPEARANCE OF IMITATION: SOUND MAKING AT ONE MONTH.

My earliest note on imitation is of B. on:

D. 15. Suggestion of mouth opening in response to mine; but a baby's lips are so frequently moving that coincidence is always possible and this seems probable here as no imitation of tongue protrusion was obtained in several tests during second and third weeks with Y.

As to Y.:

D. 28. After half a minute, in response to nurse's talking Y. responded by 'talking' back, a slight 'ah' coming softly and always in intervals of nurse's talk; an obvious reply.

E. tried to get same response but was too hurried. I said "Leave intervals for Y. to reply"; and then the response came.

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[1] As a rule exact details as to date and conditions are given, in view of their importance in the development of the general psychology of early childhood, and for the building up of criteria for tests of normal development even in the earliest months of life.

As to B. I noted also:

D. 32. Croons now in response to mine, five or six times repeated. In order to avoid the possibility of mere coincidence I used the following method. The number of his own spontaneous croons were counted during two minutes. Then during the next two minutes E. would occasionally croon to him, with this result.

		No. of croons by B.	
1st minute	No stimulus croon	8	—
2nd ,,	,, ,,	5	—
3rd ,,	E. crooning	—	12
4th ,,	,,	—	9
5th ,,	No stimulus croon	2	—
6th ,,	,, ,,	0	—

Here B. began to cry for food, so test stopped.

D. 34.	1st ½ minute	No stimulus croon	0	—
	2nd ,,	E. crooning	—	5
	(Test interrupted)			

Approximate average number of croons per minute (ignoring the 6th minute of D. 32 lest desire for food was already preventing spontaneous crooning):

No stimulus	4½
When E. crooning	10½

Here then there is a fairly clear case of one form of imitation at the age of only one month, of which other notes a few days later give further evidence.

D. 38. Guttural sound to-day, 'ar-roo,' very like French *r*, not full trill. This repeated twenty times after me: I started him with cooing and he continued so fast that counting as before seemed unnecessary labour.

D. 39. Several times recently I have started him cooing ('a-roo') when he was otherwise lying silent, and then he would go on rapidly for two or three minutes, as fast as I could reply to him, with occasional smiles.

Even earlier than this (fourth and fifth weeks) I noted several times responses made by Y. when 'talked to.'

Probably most mothers would report that they already know that such imitation takes place, but careful and measured tests are none the less necessary: for nearly every one of those mothers would also probably report with equal confidence that at three months the baby "understands everything you say to him."

A. did not at the age of one month respond to sounds nearly as much as B. did, and less than Y.[1] In similar tests with A. on D. 33 he gave on the average (over a six-minute test) 1 croon per minute when we were silent, and 2 croons per minute when E. was crooning. This difference in so short a time might, of course, be purely accidental.

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[1] In several other ways A. revealed, even in the first two or three months, less responsiveness, activity or excitability than did B. and others: *e.g.* as to his reflexes, see the author's article "Reflexes in early childhood," *Brit. J. Med. Psychol.* 1927, VII.

Only on D. 49 did A. show very definite response to my 'arroo.' It started his cooing in response (with smiles), one coo to each of mine for six or seven times; and similarly on D. 51.

I am satisfied then that, in the three of my children in whose cases I looked for this imitation, there was definite imitation of sounds before the end of the seventh week, and in B. and Y. about the end of the first month. It is not imitation of specific sounds spoken but imitation of sound making: though one can, of course, get a similar sound made by selecting the sound 'arroo' or 'goo,' which the infant predominantly makes at the time.

The earliest other records I can find for similar imitations are as follows: as to Scupin's son at one and a half months: A brrrh imitated with considerable exertion. I noted nothing in the nature of signs of great effort at this stage, though I did later in the imitation of words.

STERN. H. 2½ months. 'Erre' repeated "with evident effort[1]."

DEARBORN. D. 59. Being gurgled to produced laughter, fairly good imitation five or six times[2].

SHINN. D. 59. Piano playing produced a singing murmur as long as music lasted[3].

III. SECOND MONTH: SMILE RESPONSES.

After the end of the second month, and especially in the fourth month, other imitations besides those of sounds appear. Before the end of the second month Y.'s smiles in response to a smile were so evident that I have notes as to myself and E. carefully avoiding smiling to see if the mere sight of a familiar face produced a smile without a smile stimulus.

D. 81. Y., first real laugh in response to my laughter.

D. 100. B., during last week or two, if not much earlier, I believe smiles have led to smiles.

D. 115. B. repeatedly laughed when his mother and I laughed to him, even when he was beginning to whimper.

This response of smiles to smiles and laughter to laughter might be held to be due to an innate tendency for a smile to cause pleasure which then expresses itself in a smile; but assuming for the time being a purely behaviourist definition of imitation, and leaving distinctions till later, it should be included under imitation.

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[1] *The Psychology of Early Childhood*, p. 91.

[2] *Motor Sensory Development*, p. 24.

[3] *Notes on the Development of a Child*, I, p. 123.

IV. EARLY IMITATION OF OTHER MOVEMENTS.

Scupin noticed mouth opening when others were seen drinking at three months[1]. McDougall noted imitation of tongue protrusion at four months. I failed to get imitation of tongue protrusion in the second and third months with X. McDougall records this as noted at four months. With B. I tested it at five and a half months and noted:

D. 161. Signs of imitation; putting out tongue when I did, and holding it out for a time; so again later. I noticed that his eyes wandered from my eyes to my tongue continually. Similarly with A. (D. 173), "but it is very difficult to know whether it was not mere coincidence."

D. 162. On two occasions tongue put out after mine had been out perhaps half a minute; done fairly slowly, not sudden jerk (like impulsive movements), groping near mouth opening first. And often he looked at my tongue and back to eyes.

D. 181. Several times I tried to get tongue put out in imitation, but failed.

With C.:

D. 182. Got clear imitation of tongue protrusion. I did it five times and at the sixth time tongue came right to front and tip out. So at seventh and (less) at eighth or ninth. This not a habitual movement of his. Attention seemed held by my tongue after third or fourth movement.

With Y.:

At eight months. My tongue protrusion (and withdrawal) led to protrusion on her part (one to about a dozen of mine). She seemed very interested, trying to take hold of my tongue.

One note of Dearborn suggests also imitation of hand movement during these early months. Thus:

D. 87. Imitation seems to be on the way to-day, for L. immediately attempts to shake her hand when one makes this movement before her, and often with very good success. So far it is only her left hand that imitates.

Her left side was consistently more precocious than her right. I have not been able to get imitation in any other action than shaking the hand.

But this observation of any imitation of movement other than that of mouth—in speech, smiling, mouth opening, or tongue protrusion—stands alone before the age of five months: and Dearborn failed to obtain it again on the ninetieth day. His next reference to imitation is on D. 171, when imitative mouth movements are referred to.

V. IMITATION OF THE SOUND OF DEFINITE WORDS.

At six months imitation of other movements, *e.g.* arm waving, begins to appear but only very sporadically. Before very clear imitation of outer movements is observable we get more definite advance in sound imitation, namely the attempt to imitate a particular sound or word, and not the mere making of any sound in response to sound, a refinement of immense importance in advancing speech development. Thus in the case of Y. at five and a half months:

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[1] Stern, *op. cit.* p. 91.

D. 165. When E. was coughing, Y. gave a little cough. E. repeated it several times. I heard it three or four times. (Clearly not mere laughter.) The imitation followed slowly after an interval of some seconds, sounding like a deliberate effort.

D. 197. I looked at her (without smiling) and began to make 'ph' explosive lip sounds: after a few Y. began to imitate, her part increasing as we went on, I pausing more frequently.

And B.:

D. 213. Imitation of sound ('da-da') to-day, on three occasions within one hour, though two or three times it failed. He had been saying 'da-da' very distinctly for two days, but these imitations were faint whispers (very characteristic of the beginnings of deliberate imitation of language).

D. 217. When I said 'da-da' and then 'ba-ba' very emphatically to B., he looked at me with great interest, and repeated, after about five or six seconds, 'da-da': and so four times, each time interval about five to seven seconds; once or twice very faint whispers. This speaking seems quite different from his babbling, it is so deliberate, suggestive of effort. But the same test failed on D. 230.

With A.:

D. 234. Imitated clacking noise made with my tongue last night.

D. 235. Unmistakable imitation of clacking noise. Repeated series of about five noises of E.'s, five times out of six.

With Y., nine and a half months:

D. 290. When driving in car, she imitated the electric horn (which sounds jerkily) by a harsh intermittent cough.

Again with B., at eleven months:

D. 354. Repeated 'bow-wow' after us to-day: but I noticed, as often, that he does not attempt to say it as long as E. goes on repeating it with only short intervals, say of two or three seconds. One has to leave longer (five seconds or more) before he will imitate.

This suggests that on such occasions an important factor in imitation may be interest in the thing (sound or action). It is not a mere reflex. The child vaguely wants the sound, etc., and is satisfied if you give it. This, however, certainly does not cover all cases: for a movement is often imitated while it is still being performed by the person imitated. Cases in which it does not apply occur during this same period, namely imitation of movements such as putting the head on one side. I suggest that the sound of the voice produces a fuller realization of the sound than the sight of *e.g.* a head movement produces of head movement.

This imitation of specific sounds towards the end of the first year provides, of course, the essential basis for the learning of the mother tongue, and will be studied more exactly elsewhere.

VI. IMITATION OF MOVEMENTS: SIX TO TWELVE MONTHS.

Let us turn back to the imitation of movements other than speech. The first suggestion is in A.

D. 182. E. was waving a handkerchief about and A. showed great delight, leaning forward to watch, and then he began to wave his arms about.

B. on D. 186. Very interested in my playing a harmonica. Wanted to grasp it. E. gave him the stick but he dropped it to grasp the metals. Again she gave the stick to him and at once he moved his arms up and down so that the stick struck notes; this time he held the stick for ten or fifteen strokes, and so later, as long as the striking was continued. But later he again dropped the stick to grasp the metals, and certainly showed no tendency to strike them himself later.

If the striking was done in order to produce the sound, it was the first example noted of consciously purposive (reflective) imitation: but even so it did not apparently last long.

D. 229. Failed to get him to imitate hand wave, even by waving his hand in reply to E.

In Y. there was certainly a considerable increase of imitation in the eighth and ninth month. At seven and a half months Y. learned through imitation to do 'pat-a-cake'; at nine months she would put her head down sideways in imitation of another, both these things being done as responses so frequently as to put the fact of imitation beyond question.

Between ten and eleven months she added 'waving hands' and offering kisses, not only by making the sound but by putting her face forward; nodding and shaking head; she also imitated stretching up both arms above the head. In the tenth month she imitated the clapping of a friend's hands by taking hold of that friend's hands and trying to bang them together, either a case (I think the earliest) of imitating the *end* rather than the exact movements, or of simply getting the action reproduced by the actor himself. Also she brushed her own hair with her own brush, the first correct use of a tool, whether intelligent or not.

At eleven and a half months Y., after seeing a brother turning somersaults, with his head on a cushion on the floor, twice lay down, and, after laughing, put her head on the cushion.

When Y. had been fed with apple from a spoon, E. pretended to give some apple to a doll held by Y. Then E. gave the spoon to Y. who promptly put the spoon, though the wrong end of, it to the doll's mouth.

Several new imitations were noted also in B. at this period. The notes, including failures, are as follows:

B. at eleven and a half months:

D. 358. B. on my knee. I raised my head towards ceiling and puffed out smoke, he imitated exactly. E. timed the intervals four times between the beginning of my puffs and his responses. Times: 6 sec., 6 sec., 7 sec., 6 sec., 6 sec.

D. 359. Could not get him to imitate putting up both arms. He simply put up one, the right, even though I several times put up his left arm also (a departure for once, as an experiment, from the rule of not trying to get the child to imitate).

D. 365. When he heard and saw me playing the piano he came and thumped the bass notes. (This, of course, might be purposive.)

D. 371. Did not attempt to copy head shaking.

D. 375. Noticed head shaking to-day, but he would not do it in imitation.

D. 385. Saw me and E. kissing several times. Suddenly put his face forward and put lips to E.'s face and made kissing noises.

D. 387. Does not readily imitate my smoking now or throwing back head: has not done it to-night at all, though I tried to make him, by repeating the puffing in his sight.

But D. 387 seems to have been an exception for B., for I noted on

D. 482. He still imitates my puffing (smoking), so imitation of action goes on apparently as long as action interests.

Of A. I also noted:

D. 391. Copies me putting my head back to 'puff' in smoking, and has done so several days.

This imitation of smoking, puffing and putting back the head, is hard to reconcile with the view that primary imitation is confined to actions prompted by specific instincts[1].

Of course the separate actions of putting the head back and of puffing are sometimes done spontaneously, but the *ensemble* is not an instinctive activity. Nor is it purposive—a seen means of accomplishing a desired end: and this is still more evident in the imitation of reading at fourteen months. Thus Y. frequently in this fifteenth month put her face close to a book and made soft mutterings, as though imitating others reading aloud.

D. 614. B. imitated reading this evening. Sat on floor with book on floor and put his face close to it, moving his head across it as if reading.

This supplements the observation of a considerable number of imitations which can hardly be regarded as 'purposive,' or involving any

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[1] Cf. Washbourne, *Animal Mind*, p. 238.

'insight,' such as crooning, tongue protrusion, mouth gaping, leaning head on one side, hand waving, all occurring before the end of the first year.

To these we must now add puffing and reading aloud. Such spontaneous imitations are clearly distinguishable from others in which, now that the child of one year can understand more of the wishes of others, he can be urged to imitate, as the following note on Y. illustrates.

D. 388. To my amazement I was told that the nurse had taught Y. to wink. I was sceptical. Y. was brought and at E.'s command and example winked definitely with the left eye several times: and so later, in response to my winks, without any command. Sometimes the right eye-lid also moved: but several times I have to-day seen a distinct closing of the left eye without movement of the right eye-lid.

This imitation of winking was frequently noted on the succeeding days; undoubtedly it then became associated with the laughter she thus caused and which she evidently enjoyed, so that within a day or two she winked spontaneously. Such imitations of winking, I imagine, will not be regarded as 'instinctive' and, I hope, not at this age as 'purposive' or 'involving insight.' In this case, however, as the imitatee was the nurse, we cannot be sure that Y., though only a year old, did not understand that she was desired to do what was being done, even on the first occasions. She certainly did when I observed her.

There is no doubt that at this early stage of, say, twelve to fifteen months, one thing will be imitated and another not, without any very obvious explanation. My notes naturally tend to give more frequently cases of imitation: cases of non-imitation were occurring, of course, daily. But none of the notes reveal failures to imitate actions one might have thought likely to be imitated.

A child cannot, of course, imitate an action when the action is so complicated or so remote from his previous actions that it would be almost an entirely new one for him. New combinations and slight modifications can be made, as when 'dad-dad' was said (repeatedly) in imitation, when previously only 'dad' has been uttered. Mere ability, however, does not ensure imitation; for sometimes an action, which is done at times spontaneously, will not be imitated. (See notes D 375 above (p. 113), and also D. 387.)

One would hardly have thought it necessary to call attention to the fact that a child does not always imitate an action which he can do, had not Koffka made the curious statement that the 'compulsion to imitate' actually arises from the ability to imitate[1].

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[1] *Growth of the Mind* (Eng. trans.), p. 317.

So far, then, up to the period of about one year, we can trace a number of individual tendencies of a primary, impulsive type, not implying conscious purposive imitation. Such tendencies to imitate specific actions, no doubt, vary greatly in different individuals[1], but in none do we find a general tendency to imitate anything and everything. Nor are the actions imitated always instinctive in themselves (as, for example, reading, or puffing smoke). They are all *interesting*, otherwise the child would not observe them; but not all interesting actions are imitated.

Some actions, I think, are not imitated because they are already done for a purpose, are definitely associated with that purpose, and only used when that purpose is in mind. Thus of B. I noted:

D. 371. Did not attempt to copy head shaking.
D. 375. Noticed head shaking by B. to-day, but he would not do it in imitation.

Though Y. learned to shake her head intelligently (*i.e.* when she apparently realized she must not have something), I find no note of her imitating the head shake *in vacuo*. And in the series of thirty-eight tests described later, head shaking, nodding, and hand-waving (goodbye) which had acquired definite meaning, were almost the only actions not imitated.

VII. THE LATENT PERIOD AND THE EFFECT OF REPETITION.

Some new aspects appear in imitation shortly after twelve months. Thus the *memory* of a seen action may produce imitation. This was noted in Y. at twelve months, two weeks; when crawling round the room after seeing me open my mouth wide, she several times opened her mouth wide. Of B. I noted:

D. 415. When given a piece of clean paper, he took pencil which he had been playing with and made marks, remembering apparently last time I did it, perhaps two weeks ago.

Memory imitation is also shown in speech, *e.g.* Y.:

D. 386. In middle of slight 'grousing' to-day when she had dropped a tin box she was playing with I heard a distinct 'ta' sound. This had not been said to her, by anyone just before, in fact no one was talking to her. Probably twenty-four hours had passed since she had heard 'ta.' (At a later stage deferred imitations of speech are frequent.)

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[1] *E.g.* Major noted that while his child, at eight months, would shake a paper to make it rattle in imitation of another's action, all efforts to get him to clap his hands, or wave good-bye failed, the last being persistently tried till the baby was twelve months, before the imitation followed. *First Steps in Mental Growth*, p. 128.

Several other examples of the latent period will appear in the record of the experiments given later. Cases occur more frequently at later ages: *e.g.*

B. (2 y. 4 m.) would not imitate J. M. in a somersault yesterday; E. says he seemed frightened at her suggesting he should. But this morning he spontaneously tried it at considerable risk.

The occasional need for repetition of stimulus is also seen in B.

D. 466. E. noted B. imitated my feeding his toy donkey. I held spoon to donkey's mouth and smacked my lips, and he did the same. I have been 'feeding' his toys to make him take his food for over a week and he has only begun to imitate the last day or two.

D. 467. He readily imitated E., raising arms above head and stretching, but more completely after she had repeated it several times, *i.e.* though novelty, no doubt, has its influence, there seems to be some weight due to repetition; the idea is impressed by that—repetition at first seems to increase interest, as indeed it may in the adult, for example, in the sphere of music, and even of pictorial art.

The need for repetition will also be illustrated in some of the tests upon Y. described later (*e.g.* No. 33). It may be regarded sometimes as a necessity if the act is to be apprehended sufficiently for imitation. Or sometimes it may be that the action is made interesting chiefly through repetition and recognition.

VIII. SUMMARY OF EVIDENCE UP TO TWELVE MONTHS AND SUGGESTIONS OF A THEORY OF IMITATION.

It may be convenient at this stage to sum up the evidence we have up to the period of about a year or a year and a quarter, and to sketch a view of the nature of imitation.

Before two months, at an age long before purposive imitation can be imagined possible, we find clear evidence of specific forms of imitation. The earliest is the imitation of sound making, developing later into more and more close imitation of the actual words spoken.

Before three months, smiles and laughter are imitated.

Before six months, the curious phenomenon of imitated tongue protrusion was certainly observed.

Between six and twelve months we find broader movements imitated, requiring muscular co-ordination learned by experience, as, for example, waving hands, putting head on one side, 'smoking', making kissing noise, and winking.

These are all alike in that they are not done as a means to an end of which they are perceived to be the means.

They differ in that: (1) some are actions to which there is a strong pre-existing, innate, specific, possibly instinctive, tendency: as, for example, babbling, smiling and laughing; while (2) some are actions towards which we cannot suppose there is any specific tendency as, for example, 'smoking,' 'winking' and 'reading.'

Some psychologists would not classify the smile response under imitation, but would say that this is an innate expression of feeling, that feeling itself being called forth by a similar expression of feeling.

Others would remove from the list of imitations the speech response—saying that this is the result of the association of the child's own speech utterance with the sound of it; that sound making is a natural, spontaneous impulse, and that the utterance of a sound on hearing it is a case of ideo-motor activity.

But neither of these objections seem to justify the entire separation of the three types of early imitation. It is true that the smile response is peculiar in that it probably has a special feeling attached (though we do not know that the others have not at this stage) and is of such social importance as to justify individual consideration as a specific innate tendency. And the latter is true also of the imitation of sound making. The reference to the ideo-motor theory, however, does not help us much; for, except in a restricted sense[1], it cannot be accepted as universally true[2]; and, further, all forms of early imitation might similarly be labelled. The imitation of sound it may be suggested, is peculiar, in that if it had not been for spontaneous speech causing hearing of sound, the subsequent hearing of sound would not have brought about the speech. Certainly spontaneous speech shows the infant how to do it when the stimulus comes to imitate; but spontaneous movements of hand and head, etc., similarly prepare the way for the imitation of such and more complex movements.

We may accept with McDougall the view that some imitations are due to, or at least closely connected with, the gregarious instinct: though it would in my opinion be better to limit the gregarious instinct definitely to the impulse to get *among* one's fellows, and then further admit a tendency to imitate them in many actions, a tendency also biologically useful.

We may also admit with Thorndike: (i) an original attentiveness of man to the acts and sounds of others; and (ii) the "original satisfyingness of the approval so often got by doing what other men do[3]." Yet we cannot infer from these the absence of imitative impulses. Indeed these principles of Thorndike surely go some way towards supplying the foundations of even a *general* tendency towards imitation, which seems contrary to facts, and which Thorndike himself denies.

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[1] As indicated under type IV of cases of imitation given below.

[2] See McDougal's *Outlines*, p. 290.

[3] *Op. cit.* p. 117.

We cannot, I think, find *one* formal definition of imitation or one formula to cover all cases. The problem is partly one of exact defining of terms, rendered more difficult by the rich complexity of human nature, and especially by the over-determination of many actions by several motives blended, and by the tendency for nature to avoid sudden jumps. My own conclusions at this stage I may sum up here briefly, giving a preliminary grouping of types of imitative response.

It may first be admitted that there seems no reason to believe in a general tendency to imitate anything and everything, seen or heard. An infant is constantly being presented with examples of possible actions which he does not imitate, and to which he does not even attend except momentarily.

As to positive tendencies:

(i) There are specially strong innate tendencies to imitate certain specific things, which are necessary or useful for social intercourse, *e.g.* expressions of feeling, such as smiling and crying; and speech sounds.

(ii) There is a strong tendency to imitate when the action seen appeals to some pre-existing natural impulse, provided the situation of the moment is not unsuitable for it to be called forth. The examples of this chiefly come at a later stage than the first year. The cases overlap somewhat with the preceding type (i): there is, for example, a strong spontaneous tendency to babble and perhaps also to smile; but the former greatly declines in deaf children and the faces of the blind are well known to become less expressionful.

Many imitations, however, cannot come under (i) and (ii) above. There is no 'strong innate tendency' to throw the head back and puff as in smoking or to wink or to read aloud, nor is there a special social value in such imitations. But they, and other actions like them, would be curious actions to a little child, and they are obviously very interesting to him.

Now the imitation in such cases may be one of two types.

(iii) First it may be *the issuing into action of an idea very vividly conceived, which monopolizes attention for the moment*—as the phenomena of hypnotism are usually explained, and as may occur even in adults. For example, a snapshot I took of a high jump at some college sports reveals the Principal of the College standing near the bar, with bended knees, unconsciously imitating the jumper. With the restricted range of attention of infants it is natural to suppose that such monopolization of the whole field of attention will very frequently occur.

(iv) A second type to which such imitations may conform is one in which actual *imitation of the action serves the purpose of making the action more vividly realized.* This type again may be found in adult behaviour. For example, I sometimes find myself, in reading a vivid description of a character in fiction, imitating some mannerism or action of feature described. This theory fits in readily with many of the observed facts[1]. It will be remembered that B. imitated actions of things seen in pictures and, at a later stage, actions described in stories, as they were told to him. This was also observed of Y., as it has been of many children.

In both (iii) and (iv) the imitation will tend to follow, naturally, only when the child can already perform an action resembling fairly well the seen action. But they are neither of them of a type which necessitates the actions imitated being as one writer says (following Kohler) "of a type already thoroughly familiar and completely understood." Indeed it is for the very purpose of understanding more fully something novel, that some actions of the type of (iv) seem to be imitated.

(v) We still have a few *imitations* of actions which almost seem *of a reflex type.* The tendency to cough when one hears others cough is well known. Here is a reflex responding to a perceived occurrence of the reflex in another, not surprising when we reflect that the flow of saliva at the thought of food affords an example of the stimulation of a reflex even by a thought. One or two examples of imitation given above seem to be of this type, for example, the protrusion of the tongue[2]. The latter might be regarded as the imitation of a very interesting action; for the infants certainly seemed fascinated by it. But it occurred at so early an age, that one can hardly imagine the child in any sense knowing that the protruding tongue corresponds to *his* tongue. If, however, they are of a reflex type, the puzzling thing is to account for their existence by any degree of utility. Still, it may well be that nature is constantly throwing out experiments, as it were, in the fixating of movements as reflexes or instincts; that they appear fleetingly and, if not of use, finally disappear in time, not only in the course of the life of the individual, but eventually from the race, so that they may not appear even temporarily in any individuals[1].

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[1] Stout discusses this 'fuller realization' interpretation of imitation and gives a large place to it (*Manual of Psychology*, Book III, ch. 3). I had independently, as I fancied, drawn the conclusion, from observation of my children, that early imitation was frequently of this type. Then, on re-reading after many years Stout's chapter on Imitation, just before concluding this paper, I found, as I have done before, that an idea I imagined had arisen spontaneously in my mind was contained in that comprehensive book by my former teacher and colleague.

[2] McDougall here applies the term 'extremely simple rudimentary instinct' (*Social Psychology*, p. 106). But what of his emotion—criterion of the true instinct?

Leaving out this last fifth group as rare and doubtful, can we further simplify the classification into four groups? I think we can. In all four cases (given under (i), (ii), (iii) and (iv) above) we may infer a strong interest in the action imitated. The action which corresponds to some 'pre-existing natural impulse' is, no doubt, found specially interesting for that very reason, just as one aspect of an instinct is a tendency to be interested in and attend to certain things which provide a stimulus to the conative impulse of the instinct. In this respect imitative impulses resemble instincts, but differ from them in that the former have more general conditions for their stimulation. The type mentioned under (i) above seems to be fairly specific as regards stimuli, but it is only as regards its special strength and invariability, that the reaction is differentiated from imitative reactions to other, more general or varying stimuli. Finally, the type given under (iv)—(imitation to realize an action more vividly) seems to involve a purpose; but it is not suggested that this is a deliberate and fully self-conscious purpose. Even when I detect myself imitating a mannerism of a character in a book I am reading, I realize that it is not done after conscious decision to act for the purpose. It seems to come as a result of a slight fascination by the nature of the mannerisms, and the consequent imitation enables me to realize the situation better without my having willed that it should.

Still more, in the case of children imitating actions described in stories and pictures, it would seem quite wrong to imagine that at, say, two years of age, the child consciously decides to imitate in order to realize a story more vividly. There is first, I suggest, the impulse to imitate an action which fascinates him—monopolizes his attention—and then the added vividness of realization emphasizes this tendency, in much the same way as a process in learning by 'trial and error' is 'stamped in' by success.

All the various types, then, of imitation seem to belong to the one type, that of imitation of an action which monopolizes the attention for the moment, interest being sometimes secured through novelty of the action seen, or a strong liking for the agent, a point which will be demonstrated in some experiments described later. Further, the imitative tendency is supplemented at times under certain specific conditions as, for example, when there is already a strong pre-existing innate tendency to perform the action seen.

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[1] Cf. the evanescence of the arm-raising reflex (when an infant is startled) and of the walking reflex (which appears during the first few weeks in some children). These I have discussed in a paper "Reflexes in early childhood; their development, variability, evanescence, inhibition and relation to instincts," *Brit. J. Med. Psychol.* 1927, VII, Part 1.

It will be seen that we have arrived now at a view of primary imitation very similar in its central element to one aspect of McDougal's view, expressed in his *Social Psychology*, but to which he seems to attach less importance in his later *Outline of Psychology*.

As regards Thorndike, if we emphasize in all these types of imitation the impulse to a similar kind of activity, rather than the *exact* copying of a series of movements (which latter, as Thorndike points out, is far from being the case), we shall avoid one of the main objections which Thorndike himself brings against the view that a tendency to imitate exists, on the ground that many imitations of actions are learned. He writes: "Of course, after he (the child) has performed many acts as segments of many situations, the latter including often the perception or idea of the act, you may frequently, by performing an act, get him to perform it also. But his act is then a result of learning, not of instinct[1]."

True, 'learning' explains the exactness of the copy, but it does not explain the *impulse* to imitate, unless we approve (and surely Thorndike would not) of Koffka's dictum, already quoted, that the ability to do x *prompts* imitation of x. It is not indeed necessary for Thorndike to hold this in order to maintain his main positive assertion as to imitation; namely, that there are certain 'probable cases' of "production, by behaviour witnessed, of similar behaviour."

A description of a series of experiments which throw further light on these suggested types and theories of imitation will be given in a following paper.

IX. EXPERIMENTS ON IMITATION AT TWELVE MONTHS.

I will give now an account of a series of tests, made on Y., at twelve and a half to thirteen months, to see if further light could be obtained on the question of a specific tendency to imitate. New actions and familiar ones were performed indiscriminately.

The tests illustrate further some of the points I have touched on. In the second column it is stated whether the particular action had been previously done by Y., either spontaneously or in imitation. If known to have been done, it is important as proving the capacity to do it, and the lack of entire novelty. It is important in such tests of imitation that nothing should be said to the child urging him to do the same, and that he should not have a single word of praise for imitating.

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[1] *Educ. Psych.* I, 110.

Tests of imitation on Y., aged twelve and a half to thirteen months

Nature of action done in front of Y.	Whether previously done by Y., spontaneously or in imitation	Result
Test 1		
Putting two hands above head, held straight up	Occasionally puts hands to top of head	No effect at first; beckoned for her supper. When a little of this taken, suddenly put both hands up (without further demonstration), and so repeated. Suggestions of this latent period appear in other tests also
Test 2		
S.[1] sat on floor in front of Y. and banged floor with foot	Not definitely recorded but almost certainly done spontaneously	Y. watched with apparent interest. After a few shuffles and smiles a foot banged; first left foot and later right, and so several times
Test 3		
Kissing noise made	Learned by imitation and now often done spontaneously	Kissing responses after three of mine
Test 4		
Building up three bricks	Never done before, though Y. must have seen bricks being built up	Seemed interested, but only banged bricks together
Test 5		
E. knelt and put her head on ground three or four times	Never, but has imitated C. doing somersaults	Laughed at E. and watched with interest but no imitation. E. repeated, no imitation
Test 6		
I put my watch to her ear till she heard the tick (and smiled). Then I put watch in her hand	Tested several times during last month or two, without result	When watch put into her hands the second time she put it to her cheek just under same ear (L.). Held it out to A. and made clicking noise. Later put to my face; no effort to get it near my ear
Test 7		
I opened my mouth wide to her	Tested once at least before. Signs of annoyance had then followed, she banging her hand to and fro at my mouth	Hand waved to and fro at my mouth (as when angry) but then her mouth opened wide; so several times
Test 8		
I tore a newspaper several times and then gave it to her	Done months ago, but not recently so far as known	Tried to pull at newspaper, but no tear

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[1] S. here, as elsewhere, stands for 'Sibling'—a brother or sister of the child concerned.

Nature of action done in front of Y.	Whether previously done by Y., spontaneously or in imitation	Result
Test 9 Putting on a hat	Done months ago, but not recently	Tried to put hat on her own head; first time did not manage, did not try again. N.B. Major's child of twelve months tried to put hat on Major (*op. cit.* p. 134)
Test 10 Head shaking	Often done	(i) No result; (ii) No result
N.B. Tests 10 and 11 already mean something definite, and are fully 'realized'		
Test 11 Head nodding	Often done	(i) No result; (ii) No result
Test 12 Arms held by E. at right angles at elbow	New	Imitated (report by E.)
Test 13 Knocking over column of bricks	Last seen done by me, three or four days ago at least	When fourth brick put on and my hands away she approached her finger tip gently (as though pointing) and pushed column over. This not repeated though when I built column again
Test 14 Building bricks (four bricks)	Shown several times before but no imitation. (Last time about a week ago)	At once this time put second brick on first and tried to put third on but it fell. So again just after
Test 15 Putting cork in big ink bottle	New, so far as I know	I took the cork out and then put it in in front of her. She immediately tried to fix it in again but did not succeed; second attempt—offered it to me; third, attempted to put it in, then took cork to mouth. Looked at my face at once when she had done it
Test 16 Gave her three bricks (to see if deferred imitation shown)	See test 14	At once tried to put second brick on first; succeeded after several futile attempts. After succeeding crawled away. When called back and three bricks again put on carpet separately, she put second on first and then tried to add third
Test 17 I was shaking my finger at S. who was holding Y. (no intention of test) telling him something to remember	Never done before, though of course she may have seen such pointing	E. suddenly noted Y. was pointing finger and wagging it somewhat similarly. E. did the same; Y. turned to S. and wagged her finger to him and seemed satisfied only when he joined in

Nature of action done in front of Y.	Whether previously done by Y., spontaneously or in imitation	Result
Test 18 Hand wave	Frequent: it already has a meaning for her	No imitation, but offered hand to shake
Test 19 Head shake (No)	Ditto	Imitated with a smile
Test 20 Head nod (Yes)	Ditto	Imitated with a smile
Test 21 Two hands over head	New, so far as known	No imitation, but very busy with a toy
Test 22 As 21, on E.'s knee, no toy	—	Imitated this time
Test 23 Put waste paper basket over my head	New, so far as known	When I put open end towards her, she took hold of each side and bent her head down, slightly inside basket (too heavy to lift up). So again second time; but then it ceased to interest her and she made off for papers on floor
Test 24 E. rubbing cream into her own hands (not deliberate test)	New, so far as known	Movements clearly imitated
Test 25 I opened my mouth wide, facing Y.	See test 7	Opened her mouth (twice) and put first finger in as though pointing. Later simply gaped at me twice
Test 26 When Y. imitated E.'s putting head on one side, I called her attention to me and did the same	Often imitated before	No imitation of me followed. But again Y. imitated E. Then again no imitation of me. Again imitated E. Then again no imitation of me
Test 27 S. twanged toy violin and threw it down (not deliberate)	Probably played with before	Seized violin and pulled its strings; purposive imitation here?
Test 28 Scratched my head	Done spontaneously, no doubt	Hands up to head and slow scratching movement
Test 29 E. bobbed up and down, doing physical exercises	New, so far as E. concerned	Y. laughed and began to bob up and down similarly. So later when I did similar exercises
Test 30 E. was airing garment in front of the stove (not done as test)	No doubt seen occasionally; never done	Y. went and took another garment, toddled to stove and solemnly held it in front of stove like E.

Nature of action done in front of Y.	Whether previously done by Y., spontaneously or in imitation	Result
Test 31 Said 'ta' to her, nothing being offered	Often tried. Never had imitation followed. But last night it had been whispered after giving of toy, and later had been practised by her and twice shouted	Imitated at once, softly whispered, but very clear
Test 32 E. took a hand-mirror and patted it, then gave to Y.	Certainly new	Y. took mirror and at once patted it several times, and then gazed into it. Notable that she patted it first because the right side was towards her
Test 33 (*a*) Still trying to get something she would not imitate, I took a book, put it on the floor and put kettle lid on it	Certainly new	(*a*) Lid lifted and thrown behind. Book played with
(*b*) Test repeated	—	(*b*) Same result as above
(*c*) Test repeated	—	(*c*) Lid now taken and placed steadily on book. (Again effect of repetition?)
(*d*) Test repeated	—	(*d*) Book opened and lid put inside. She had just found slip of paper inside and tried to replace it and attempted to close book
Test 34 E. doing "Peter works with one hammer," then two and three, working finally two hands, two feet and head	Quite new	Laughter. Then one hand lifted and waved and one leg lifted (as she sat on floor) and held aloft. No movement of head
Test 35 Y. sitting in cot. I rested my chin on top side	New	Stuck out her chin in same attitude and comically like expression but not on rail: and so three times
Test 36 E. had her chin on hand (not done as test)	—	Put her hand to chin in exactly the same way
Test 37 E. doing exercises, arms extended, hands gyrated at wrist (not done as test)	Seen a number of times	Y. repeatedly imitated and now does the action easily

It will be seen that in 31 out of 37 tests there was imitation; and in several of the negative cases there was a good reason for the absence of imitation. Thus in test 21, Y. was busily occupied with a toy; when she was without a toy, the same test, 22, was successful. In tests 11, 12 and 18 the nodding and shaking of the head and the hand moving had already acquired a meaning for the child; and it is likely that she would be disinclined to do these things when she was not 'thinking' their mental correlate at the time[1]. Apart from these four tests, the only failure to imitate was in test 5, and test 4—the building up of three bricks—which may have been beyond her capacity at the time, and to which the banging of the bricks may be considered some approach. I may add that about half-way through this series I asked several other members of the household to suggest things that Y. would be likely *not* to imitate, but within her capacity. Yet we failed to find anything.

Now none of these imitations (with one exception) could be considered 'reflective' (consciously purposive) or done with 'insight' into any value or end. There may, no doubt, be in some a satisfaction in doing a novel thing (*e.g.* test 15). But that is, I suggest, an aspect of one of the types of imitation given above.

It is possible there was more imitation by Y. than by any other of my children, though I cannot be sure that the others were less imitative (especially B. and X.) in the absence of exact tests. Lest Y., however, might be considered quite exceptional in her tendency to imitate, I gave a colleague the list of tests given above and he kindly undertook to apply them to his boy, aged 1 y. 10 m. This colleague, I may add, is a competent psychologist, with training and considerable experience in experimental work and in testing young children. I give below a summary of the results[2].

X. EXPERIMENTS ON IMITATION AT TWO YEARS

All but 4 of my 37 tests were given by Mr C. Out of the 33 done, 25 were imitated—in two cases with a latent interval. Of the 8 in which no imitation followed:

(*a*) Two were the 'head shaking' (meaning 'No'). In the first of them the child "looked puzzled—stopped playing with book and pointed to bricks, no doubt taking the head shaking as meaning prohibition." In the second case also he looked puzzled.

(*b*) One was the head nodding—"the child turned to his toys laughing."

(*c*) One was the hand wave—"which has a meaning—the child said 'No.'"

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[1] Cf. Dr T. Ischikawa's remark that the growth of association paths makes imitation 'harder.' *Beobachtungen über die geistige Entwicklung eines Kindes.* (Beyer and Söhne, 1910.)

[2] My thanks are due to Mr A. E. Chapman for so carefully carrying out these tests.

(*d*) One was the saying of 'ta' (No. 31) which was not imitated but *obeyed*, the child offering the toy he was playing with.

This leaves only three cases of failure to imitate when the stimulus did not *mean* something, viz. Nos. 28, 32 (in which the mirror was wisely looked into instead of being patted) and 36, which might be regarded as too commonplace an action to be interesting at 1 y. 10 m.

Before the experiments were done on Mr C.'s boy I was anxious to see if the strong tendency to imitate was still present in Y. to the same degree at two years of age. So most of the tests given at one year were repeated on Y. at 2 y. ½ m. in a series extending over three months.

In these I also tested the influence of the person imitated. It will be noted that, in one or two of the first series of tests at one year, Y. only imitated when her *mother* performed the action. In this second test series I sometimes arranged that others should first perform the action and then, if no imitation followed, her mother (E.) repeated the action. The number of each test indicates which test it was in the earlier series.

Experiments of imitation on Y. at 2 y. 0m. to 2 y. 3½ m.

No. of test and person doing it		Result
1 (i)	S.[1]	No imitation
(ii)	F.	No imitation
(iii)	E.	Imitated
2	E.	Imitated
3	E.	Got up and kissed E. When E. persisted, said "Don't do that," then got up and kissed her again
4	S.	Imitated
5	E.	Imitated
6	F.	Imitated
7	F.	Looked at me silently
	S.	Said "Don't"—so several times
	E.	Said "No, mummy"—then her mouth gaped open and so a second and third time
8	E.	Took torn paper but no further tearing
9	E.	Imitated
10	E.	Laughter
11	E. (head nodding)	"Don't do that," repeatedly
12	S.	Imitated
18	S. (hand move)	No imitation
	E.	No imitation
23	S.	Imitated
25	F.	Said "Funny Daddy—Mummy do it," then did it herself
29	E.	Imitated
34	E.	Ditto
36	E.	Ditto

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[1] S. throughout stands for Sibling and is used when the use of the usual letter might ndicate the relative ages of the children. In these experiments F. means the writer of the paper.

	New additional tests	Result
40	Arms stretched up, F. Arms stretched up, E.	Looked and said "Mummy do it," then put her own arms up
41	S. opened mouth to show throat to E.	Imitated[1]
42	F. lay on back and did leg exercise	Amused and said "Look Mummy," but no imitation
	E. lay on back and did leg exercise	Imitated
43	E. lay back on floor	Imitated
44	E. was sitting on floor with hands clasped on knees	Imitated, with some difficulty
45	Miss G., living in the house and well known to Y., put two bricks on her own head	No imitation, Y. puts bricks back in box
	E. did the same	Imitated
46	F. puts a brick on his foot	Y. goes on packing up bricks, which she is eagerly enjoying
	E. puts a brick on her foot	Packing continued
47	Miss G. put brick on her own head	Imitated
48	Miss G. held brick under her chin	Y. laughed and put one under E.'s chin then under her own, then one under S.'s chin and again under her own
49	Miss G. put piece of wood in her slipper	Y. took it out and tried to do same

This second series of tests, extending from 2 y. ½ m. to 2 y. 3 m., showed two things.

(i) The strong tendency to primary imitation (of actions with no 'purpose' beyond themselves) remains undiminished at two years as compared with one year. Of the 28 things done, leaving out again the significant hand waving and head nodding, all are imitated except three, Nos. 8, 10 and 46, and in this last test Y. was keenly enjoying packing bricks into a box.

Similarly in everyday life she continued to imitate a number of things which served no other end for her; for example, she often sat imitating 'reading aloud' from a book, during the period 2 y. ½ m. to 3 y., and even after that.

(ii) Y. will sometimes imitate her mother when she will not imitate others, see tests 1, 7, 25, 40, 42 and 45. Compare also test 26 in earlier series.

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[1] This gaping open of the mouth seemed to have a peculiar fascination for Y. She shuddered at it—but imitated, at about 12 months. She imitates again at two years; and as late as three and a half years, when I stood in front of a loud speaker when a speech was being broadcasted, and opened my mouth as though I were the speaker, she watched earnestly and then opened wide her own mouth.

XI. THE IMPORTANCE OF THE IMITATEE.

We see then, that, while Y. will imitate many actions performed by others, it is her mother who 'sets her off,' as none other can. It is, I suggest, the mother whose actions are supremely interesting and with whom especially the child delights to be in accord.

The others whom Y. would sometimes imitate but sometimes refuse to imitate, were also members of the house. I have little doubt that the appearance of a relative stranger would usually so embarrass a child that the stranger would not be imitated to nearly the same extent—that is, at an age when the child is made shy by the presence of a stranger[1]. This ignoring of the importance of the imitatee, weakens the observation of some experimenters, that in the laboratory they have frequently tried to get imitation of simple movements (like putting two hands together) in children of from ten to eighteen months, without much success.

The partial dependence of imitation on the imitatee no doubt also partly accounts for the striking divergence of our test results from Thorndike's statement quoted on the first page of this paper, to the effect that nine times out of ten an infant does not imitate a simple action. My own tests and those I quote from Mr C. show that it is almost exactly nine times out of ten that these children *did* imitate, when they were under normal home conditions.

(iii) A further curious fact, too, was observed in the tests on Y., namely that sometimes she made her mother perform the action first done by another, before she, Y., would imitate it.

At other times she showed a similar desire for others to do the thing that E. and Y. herself were doing, as in test 49 just mentioned. Again, at 2 y. $\frac{1}{2}$ m., when S.'s friend M. was sitting leaning forward with chin on hand, Y. said "S. do it" and was satisfied. The note follows: "She often wants a third person to do likewise when she imitates another."

Here, I think, we are getting beyond the phenomenon of the simplest primary imitation, though we may regard it as a kind of satisfaction in seeing an action imitated by a third person (even on the primary, 'purposeless' level), similar to that gained by satisfying the impulse to imitate another oneself.

When the child herself imitates and gets someone else to imitate, it may well be an example of an action prompted by the original satisfaction of doing what others do, and that this satisfaction is increased when the 'others' are increased in number, "the more we are together," indeed. If one makes a slight, but important modification of Thorndike's phrase quoted above as a main source of imitation (viz. "the original satisfyingness of doing what others do" instead of "the original satisfyingness *of the approval* (italics mine) often got by doing what other men do") we get, I think, very near to the truth of this supplementary aspect of primary imitation, an aspect probably more important in the third year than in the second. Instincts and innate impulses rarely, if ever, work entirely alone except perhaps during the first few months of life. By two years, the tendency for the presentation of immediate and fascinating action to issue in action may very well be supplemented—and almost supplanted, by the growth of an aspect of the gregarious impulse, or of something closely related to it, namely the enjoyment of being at one with others, of being and doing as they are and do, and especially of being thus at one with the beloved mother or father or sister. Yet the fact that Y., *without herself imitating*, sometimes got a third person to imitate the second, suggests that this satisfaction in doing what others do is not the sole supplementary impulse at work on such occasions.

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[1] At a later stage, or when the first shyness is overcome by a period of friendly intercourse, the fact that a stranger whom the child finds attractive is doing something may conceivably make it *more* likely to be imitated.

XII. PRIMARY IMITATION AMONG ADULTS.

Purposeful or 'reflective' imitation begins to appear at least soon after the age of twelve months, when means to a desired end which others are seen to use, may be imitated by the child; and from the age of three years the frequency of primary, purposeless or non-deliberate imitation seems to decrease. Yet it certainly appears even in adult life, as I have already indicated, and it is possible that its frequency and influence is much greater than is commonly thought. Under the heading of 'suggestion' some psychologists have recognized its effect, though chiefly in the domain of thought and belief.

Perhaps the best illustration of primary imitation after infancy is to be found in the involuntary imitation of mannerisms. I noticed that two of my boys, each of whom, at periods separated by about two years, studied under a master who had the habit of sniffing slightly, themselves acquired the habit while in his form, but dropped it shortly after leaving the form.

I invited my class of University graduates to report (anonymously) examples of involuntary imitation which they had themselves indulged in since early childhood; 23 women and 9 men gave instances of their own, out of 38 women and 44 men.

The relative numbers are interesting in view of the fact that the observation of little children suggests that girls are more imitative than boys[1]. Similarly, in a second group of 43 women and 31 men, the recollection of primary imitation was reported by 35 women and 14 men.

The examples given refer chiefly to mannerisms of speech or facial expression and to the imitation of movements seen when watching games, but there are also a number of references to 'unconscious' imitation (as some of them called it) of the handwriting of some admired person. There was further evidence, too, of the familiar tendency of some persons to fall into the peculiar accent of a district to which they have removed.

To trace the possible influence of involuntary or purposeless imitation in adult life would however take us too far from the main object of this paper, which has been to supply evidence of its existence as a genuine innate tendency.

XIII. SUMMARY OF RESULTS AND CONCLUSIONS.

1. The wide divergence of the views of leading psychologists about imitation demands a thorough enquiry into the facts as to the beginnings of imitation during infancy.
2. Actions to which there is already an innate tendency are imitated very readily within the first few months, *e.g.* sound making and smiling.
3. Actions which can serve no purpose perceived by the child and which are not based on instinctive impulses, are imitated freely between the ages of nine and twelve months.
4. There is sometimes a 'latent' period between the seeing of an action and the imitation of it, and sometimes the repetition of an action is necessary before imitation follows.
5. Primary, involuntary, or purposeless imitation seems to be due to the monopolization of attention for a moment by some fascinating impression.
6. Some imitations seem to serve the purpose of helping the subject to realize or enter into the experience of the imitatee more vividly.
7. Some imitations are of a reflex type, if the term reflex can be applied where sight provides the only stimulus.

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[1] This was certainly my impression of my own children, especially in reference to language. Stern asserts quite confidently that girls are more imitative than boys.

8. Experimental tests at twelve months and at two years suggest that the tendency to imitate any very interesting action is very strong in some children.

9. The imitatee is important: *e.g.* a child will sometimes imitate its mother but not another person.

10. There is some evidence that a child may wish others to join in the imitation.

11. The testimonies of two large groups of students show that primary, involuntary imitations are recognized as having taken place in adult life in a substantial proportion of cases, especially among women.

12. The evidence as a whole seems conclusive against the view of some *Gestalt* psychologists that imitation is always purposive.

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CHANGE AND DECAY IN THE VISUAL MEMORY IMAGE

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I. *Problem and method* (pp. 133–135).
II. *Results* (pp. 135–143).
  A. *General changes* (pp. 136–139).
  B. *Analysis of pyramid* (pp. 139–140).
  C. *Analysis of key* (pp. 140–143).
III. *Interpretations* (pp. 143–146).
IV. *The Gestalt theory of memory* (pp. 146–148).
V. *Summary* (p. 148).

I. PROBLEM AND METHOD.

THIS study is concerned with an examination of the characteristic lines of change and decay in the visual memory images of children. Its theoretical interest centres chiefly in the bearing of its findings upon the law of *Prägnanz*, according to the Gestalt school, the most general law of memory[1]. The investigation is similar in purpose and method to research previously published by F. Wulf[2] and J. Gibson[3]. The methods employed in these three studies may profitably be compared.

Subjects: Wulf, 6 adults; Gibson, 6 adults; Allport, 350 children, average age 11 y. 4 m. (range, 10–13 y.).

Type of stimuli: Wulf, simple, unfamiliar designs of 2 to 13 lines; Gibson, simple, unfamiliar designs of 3 to 8 lines; Allport, Binet (*X*, 3) designs (truncated pyramid with 12 lines and Greek key with 13 lines). Although no more familiar than the figures used by the other investigators, these designs were more closed and more geometrical in appearance.

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[1] Cf. R. M. Ogden, *Psychology and Education*, 1926, pp. 235–238; also W. Köhler, *Die physischen Gestalten in Ruhe und im stationären Zustand*, 1920, p. 259.

[2] Beiträge zur Psychologie der Gestalt (edit. by K. Koffka); VI. "Ueber die Veränderung von Vorstellungen (Gedächtnis und Gestalt)," *Psychol. Forsch.* 1922, I, 333–373.

[3] "The reproduction of visually perceived forms," *J. of Exp. Psychol.* 1929, XII, 1–39.

Number of designs: Wulf, 26; Gibson, 28; Allport, 2.

Size of designs: Wulf, *cir.* 1 in. × 2 in.; Gibson, "maximal dimension for any figure was $\frac{7}{8}$ in."; Allport, total size for two designs, 7 in. × $2\frac{1}{2}$ in.

Method of exposure: Wulf, cards placed before subjects; Gibson, Ranschburg memory apparatus; Allport, cards on pupils' desks.

Exposure time: Wulf, 5–10 seconds; Gibson, $1\frac{1}{2}$ seconds for each design in a series of 7 or 14; Allport, 10 seconds for two designs on one card.

Number of reproductions secured: Wulf, 400; Gibson, 4000; Allport, 1000.

Time of reproductions: Wulf, after 30 seconds, after 24 hours, after 1 week, and in some cases after 2 to 8 weeks; Gibson, immediately after a series of 7 or 14 designs had been exposed; after 5 weeks, after 1 year; Allport, immediately after exposure, after 2 weeks, after 4 months.

Other conditions: Wulf and Gibson worked with subjects individually; Allport used school-room classes. The subjects used by Wulf and Gibson knew they were to be called on to reproduce the designs; the school children had no warning. Introspection was secured by Wulf and Gibson, not by Allport.

Each of these three studies aims to discover the characteristic alterations in the form of a visually perceived figure after the perception has passed into a trace or engram in memory, and has remained there with little re-arousal and no correction for some period of time. Each investigator tries to detect the change that occurs in this memory content by securing from the subject, after various intervals of time, drawings of the original stimulus as he remembers it. It is not strictly correct to regard the discrepancy between the drawing and the original *Vorlage* as indicating alteration exclusively in the visual memory image. Neither Wulf nor Gibson make such a claim, since the reproduction of the design may be in part a product of motor imagery, verbal conceptualization, or even some more ephemeral *Wissen*[1]. The presumption in the present investigation, however, is that the results bear *primarily* upon visual retention, since the designs were such as to exclude 'object assimilation' (that is, retention through their resemblance to familiar objects), and probably were too complex for verbal conceptualization by a child. The instructions for the reproductions asked the children to "see again in their mind's eye" the original card and to draw what they 'see.' Furthermore, the entire research took place in connection with other experiments on eidetic imagery in which the emphasis throughout was upon visual retention[1].

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[1] Wulf, *op. cit.* pp. 343 f.

The material for the present study was gathered in 1923–4 from elementary school children in Cambridge, England. The experimenter placed face downwards upon each pupil's desk a white card, 8 in. × 6 in. upon which the two designs were printed in bold black lines. The truncated pyramid appeared on the left when the card was turned over[2]. After looking at the designs for 10 seconds, the time allowed for the test by Binet, the children at a given signal again turned the cards face downwards, and immediately drew the designs from memory upon a sheet of paper, same size as the card (8 in. × 6 in.). They were not permitted to see the designs again. Without warning, the experimenter returned in 2 weeks and again in 4 months, and after providing the same sized paper (in some cases the paper was longer, 8 in. × 11 in.), requested the children to draw again what they had seen on the card.

Three reproductions were thus obtained for 275 cases. The reproductions will hereafter be designated as follows: 1—immediate reproduction, 2—reproduction after 2 weeks, 3—reproduction after 4 months. In the remaining cases (approximately 75) only two reproductions were secured. These cases are not reported in the present study, since they exhibit no new characteristics, and since comparisons are more significant for the cases in which the set of three papers is complete.

II. RESULTS[3].

A preliminary inspection of the papers revealed that 42 directions of change and decay could be readily identified. The changes in each paper were accordingly tabulated under each of these headings, the record generally indicating merely the presence or absence of the type of change in question. In order that the three papers for each child might be listed together, each of the headings had three sub-columns for reproductions 1, 2 and 3, and the names of the children appeared at the left of the tabular sheet. The following headings were employed:

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[1] It was originally thought that the excellence of the reproduction of the designs might facilitate the selection of children with eidetic powers (cf. L. T. Carmichael, "Eidetic imagery and the Binet test," *J. Educ. Psychol.* 1925, XVI, 251-252). The method proved, however, not to be adequate for the selection of *Eidetiker*, for only 3 per cent. of the cases reproduced the pyramid perfectly in all three trials, and only 5 per cent. reproduced the key perfectly; while not more than 1 per cent. drew both designs correctly in all three trials. The percentage of *Eidetiker* among children of this age is presumably far greater (cf. H. Zeman, *Zsch. f. Psychol.* 1925, XCVI, 226, and G. W. Allport, this *Journal*, 1924, XV, 101, 104). Even if we confine our census to the 'T-type,' the correspondence is not close enough to be even suggestive.

[2] Burt following Binet's instructions uses the designs in this arrangement, while Terman places the Greek key, the more difficult, at the left; C. Burt, *Mental and Scholastic Tests*, 1921, p. 56, and L. S. Terman, *The Measurement of Intelligence*, 1916, p. 261. The designs in the present experiment are somewhat larger than those used by Terman or Burt. Terman's two figures together measure 5½ in. × 1½ in.; the dimensions of the figures used by Burt are 5 in. × 1½ in.

[3] The writer is indebted to R. G. Morrill and E. N. Scadron for assistance in the tabulation of these results.

A. General changes. Excellence of reproduction: pyramid perfect, key perfect, test passed. Size alterations: pyramid increased, pyramid decreased; key increased, key decreased. Displacements: pyramid and key interchanged, key upside down or on side. Assimilation and omissions: pyramid affected by key, key affected by pyramid, both in one drawing; pyramid omitted, key omitted.

B. Analysis of pyramid. Broad strip displaced, strips equalized, rectangle changed to square, to cube, oblique lines omitted, central rectangle omitted, telescoping, change to oblique parallelogram, presence of curved lines, simplification (less than 12 lines), elaboration (more than 12 lines), disintegration (lines fail to close), and remarks.

C. Analysis of key. Simplification, elaboration, under-emphasis of loops, exaggeration of loops, only loop quality left, exaggeration of zigzag quality, only the zigzag left, under-emphasis of stalk, over-emphasis of stalk, error in direction of one loop, errors in two loops, telescoping of form, disintegration, presence of curved lines, remarks.

The results will be briefly reviewed under these headings, excepting where the data from certain of the divisions can be more advantageously considered together.

A. *General changes.*

(1) *Excellence of reproductions.* In the first trial 31 per cent. of the pyramids were accurately reproduced, 12 per cent. in the second trial, and 6 per cent. in the third trial; in the case of the key the figures for the three trials respectively are 26, 12 and 8 per cent. In all three reproductions the pyramid was correctly drawn in only 3 per cent. of the cases, the key in 5 per cent. Scored by the Terman standards, 63 per cent. passed the test at the first reproduction, 42 per cent. at the second, and 26 per cent. at the third.

(2) *Alterations in size.* Table I shows a marked tendency for the first reproduction to be smaller than the original, and for still more cases to show shrinkage with the passage of time.

Table I. *Size of reproductions (compared with original designs).*

Reproduction	Pyramid: Equal or larger (%)	Pyramid: Smaller (%)	Key: Equal or larger (%)	Key: Smaller (%)
1	22	78	34	66
2	8	92	27	73
3	5	95	22	78

A further tendency not shown in the table was the *progressive* shrinkage of the image for the individual child. When the successive reproductions were compared, not with the original designs but with each other, evidence was found of *continued* shrinkage of the pyramid in 49 per cent., and of the key in 46 per cent. of the cases. No alterations in size were recorded unless they were marked by at least a 20 per cent. increase or decrease.

(3) *Displacements.* In the first trial 4 per cent. of the reproductions showed an interchange of position for the pyramid and key; in the second trial 14 per cent. were interchanged, and in the third 21 per cent. As for inversion of the single figure, it was not possible to tell whether the rectangular pyramid was inverted, but inversion or tilting on one side occurred in the key in 9 per cent. of the first reproductions, 15 per cent. of the second, and 19 per cent. of the third. *Raumverlagerung* is a familiar phenomenon in children's drawing[1]; from the present investigation it appears that it has a tendency to increase with the lapse of time.

(4) *Assimilation and omission.* In a few cases the features of one of the designs appeared to be incorporated into the drawing of the other. The pyramid was noticeably affected by the key in 0·4, 1·5 and 3 per cent. of the cases; while the key showed the impress of the pyramid in 10, 13 and 15 per cent. of the reproductions (see Chart, 2). Just why the key should absorb some of the characteristics of the pyramid more often than the pyramid absorbs the key is not clear. It may be due to the nature of the figures, or to the fact that the figure on the left has a favoured and more stable position. Gibson finds figure assimilation the most frequent kind of change in his experiments, occurring in 16 per cent. of the cases, but he believes his method was "especially favourable for the influencing of one figure by another[2]."

On no occasion were both designs assimilated into a single drawing.

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[1] Cf. W. Stern, *Zsch. f. ang. Psychol.* 1909, II, 498–526, and P. Meyer, *Zsch. f. Psychol.* 1913, LXIV, 46.

[2] Gibson, *op. cit.* p. 25.

A sense of *two* designs was almost universally retained. In no trial did more than 1 per cent. of the subjects omit either figure, and in these few cases the remaining figure did not show any evidence of *Mischwirkung.* Both Meyer[1] and Gibson[2] found occasional fusion of two or more figures into one, but their serial method of presentation is probably responsible.

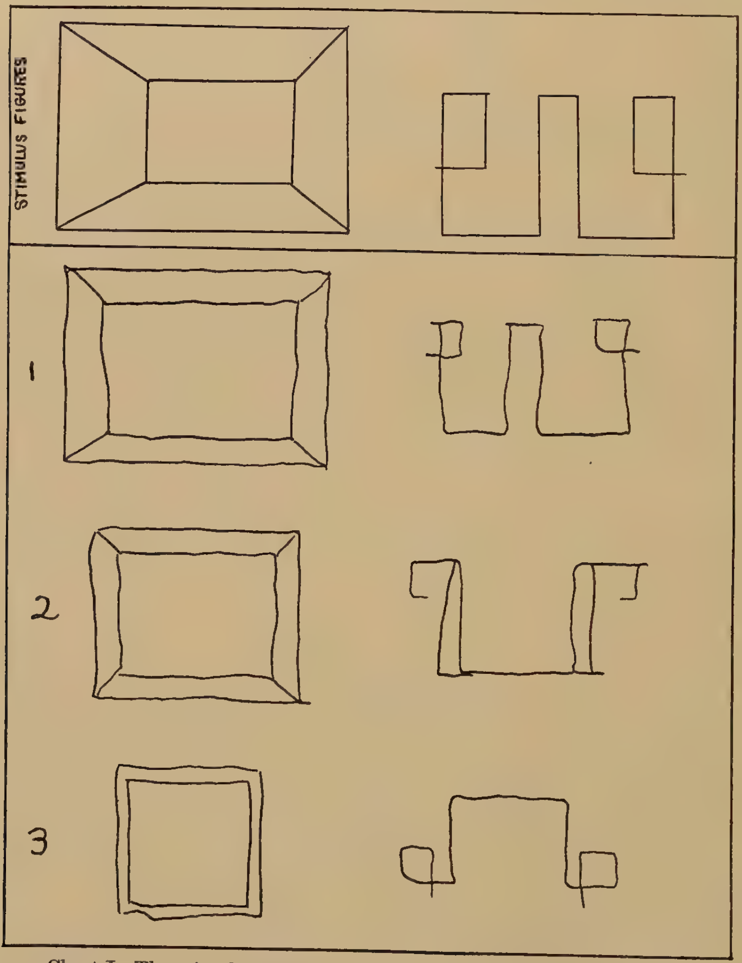

Chart I. The stimulus figures and a typical series of reproductions[3].

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[1] Meyer, *op. cit.* p. 42.

[2] Gibson, *op. cit.* pp. 23, 26.

[3] The designs and the reproductions are approximately one-third their original size. The rows numbered 1, 2, 3 contain the results of the reproductions immediately after exposure, after 2 weeks, and after 4 months, respectively.

The changes described in the text that are illustrated in this series of reproductions are the following:

General changes: failure to pass test after 1; progressive shrinkage in pyramid; displacement of key (upside down) in 3; key affected by pyramid in 2.

Analysis of pyramid: equalizing of strips in 1, 2, 3; changing rectangle to square (progressive); omission of oblique lines in 3; progressive narrowing of strips; simplification in 3.

Analysis of key: simplification in 3; under-emphasis on loops in 2; under-emphasis on stalk in 2, 3; errors in direction of two loops in 2, 3.

Remarks: greater simplicity and symmetry characterize the successive reproductions.

B. *Analysis of pyramid.*

(1) *Displacement of broad strip.* In the first reproduction 15 per cent. of the subjects placed the broad strip on one of the three sides of the figure where it did not belong; in 2, 19 per cent. of the subjects; and in 3, 30 per cent. of the subjects.

(2) *Equalizing of strips.* There is a marked tendency for the subjects to lose their impression of asymmetry of the figure, and for all four strips to become equal: in 1, 39 per cent.; in 2, 52 per cent.; and in 3, 56 per cent. If we add these cases of equalized strips to the cases reported above where strips were displaced, we have totals for what might be called 'strip trouble' of 54, 71 and 76 per cent. These large percentages indicate a conspicuous instability in an asymmetrical figure, a phenomenon which Kuhlmann and other investigators have previously reported[1].

(3) *Changing rectangle to square or cube.* The percentage of cases in which the outside dimensions of the pyramid become equalized, so as to produce a square design are for the three reproductions respectively, 10, 13 and 40. It is perhaps noteworthy that the longer period of oblivescence was accompanied by the chief increase in symmetry. Of the 27 per cent. of cases producing a square in the third reproduction, but not in the first or second, the majority showed a slight but unmistakable tendency toward this form of alteration in the earlier reproductions. In very few instances was there tri-dimensionality in the reproductions, a cube-quality appearing in only 0·3, 0·7 and 1 per cent. of the cases.

(4) *Omission of oblique lines.* This change occurred in only 0·3, 4 and 8 per cent. of the cases.

(5) *Omission of central rectangle.* This change rarely occurred. Two rectangles, one enclosed within the other, remained in all excepting 0·3, 2 and 3 per cent. of the cases. Thus the inner rectangle appears to be somewhat more stable in the image than do the connecting oblique

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[1] F. Kuhlmann, *Psychol. Rev.* 1906, XIII, 347; Wulf, *op. cit.* pp. 352, 356; Meyer, *op. cit.* p. 42.

lines. There was little tendency for telescoping of form to take place, *i.e.* the carrying of the oblique lines all the way across the figure, the percentages being 0, 1 and 2. There was a striking tendency, which is difficult, however, to state in quantitative terms, for the remaining inner rectangle either to shrink, thus magnifying the strips, or to expand (see Chart I), with the result that the strips become very narrow.

(6) *Change to oblique parallelogram.* Such a change would enhance the asymmetry of the figure by causing right angles to become oblique. This phenomenon practically never occurred, the percentages being 0, 0·7 and 0·7.

(7) *Presence of curved lines.* Not only are right angles retained but also the rectilinearity of the figure. Curved lines appear in only 0·3, 1 and 0·3 per cent. of the cases[1].

(8) *Elaboration or simplification.* There is virtually no tendency for the figure to become more complex in respect to the number of its component lines, the percentages for the three trials being 0, 2 and 3. There is likewise little tendency for the reproductions to contain less than 12 lines, the percentages being 0·3, 8 and 8. In general, the notion that one rectangle was enclosed within another and connected with it by oblique lines was well retained.

(9) *Disintegration.* Another rare type of change, occurring in only 0·7, 1 and 3 per cent. of the cases. The figure was apparently too firmly knit to fall apart in the image.

C. *Analysis of key.*

(1) *Simplification and elaboration.* In the first trial 21 per cent. of the cases showed simplification, in the second trial 32 per cent. and in the third 41 per cent. These results tell nothing about the quality of the change, but indicate a decided tendency toward a reduction in the number of component parts of the design, roughly proportional to the lapse of time. In the first reproduction 13 per cent. showed elaboration, in the second 15 per cent. and in the third 9 per cent. Not only is elaboration less common than simplification, but it tends to decrease after a time, whereas simplification increases.

(2) *Under-emphasis of loops.* These percentages represent cases where there was a failure to close the loops (as in Chart I, 2), or where one or both loops were omitted. The percentages for the three reproductions are 18, 31 and 38.

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[1] Gibson (*op. cit.* p. 31) found no cases whatever in which the lines of an exclusively straight-line figure became curved.

(3) *Exaggeration of loops.* This item includes cases where the number of loops was increased or their prominence accentuated (not merely by the omission of the central stalk). This type of change occurred in only 5, 7 and 5 per cent. of the trials. In a few cases, 2 per cent. in each reproduction, nothing was left in the image excepting the loop quality of the design. The records thus show a much more pronounced tendency for an under-emphasis than an over-emphasis of loops.

(4) *Exaggeration of the zigzag quality.* The four long vertical lines in the figure give an effect which might be described as back-and-forth or zigzag. There was some type of over-emphasis (not produced merely by the omission of loops) in this characteristic in 10, 13 and 12 per cent. of the cases. In 6, 9 and 15 per cent. of the reproductions loops were omitted entirely, so that nothing excepting the zigzag quality remained. It would therefore appear that, for purposes of retention, the zigzag quality is the more essential feature of the key.

(5) *Under-emphasis on stalk.* In this category are included both reductions in the size of the stalk compared with the rest of the figure, and omission of the stalk. The percentages are 31, 46 and 57, showing this type of levelling to be a common trend in the deterioration of the image.

(6) *Over-emphasis on stalk.* Duplication, pronounced elongation or other elaboration of the stalk occurred in 6, 5 and 4 per cent. of the cases. This type of sharpening is not common and seems to decrease slightly with time.

(7) *Errors in the direction of one loop.* The percentages are 15, 17 and 10. The decline of this type of error in the third trial is bound up with the next phenomenon.

(8) *Errors in the direction of two loops.* Both loops show errors of direction in 18, 37 and 44 per cent. of the cases. In virtually every instance this change means a simple reversal of both loops, so that instead of facing inward they face outward from the figure. Some children in the first and second trials turned one loop and in the third trial also turned the other.

(9) *Errors in loops in general.* If percentages are combined for under-emphasis, omission, errors in the direction of one or both loops, we find that 'loop trouble' occurs in 54, 68 and 71 per cent. of the cases. This instability of loops is nearly as marked as is 'strip trouble' in the case of the pyramid (B (2)).

(10) *Telescoping of form.* By telescoping is meant some definite intermingling of loops and stalk. The percentages are 7, 9 and 8.

Virtually no cases of analogous telescoping in the pyramid are found (B, (5)).

(11) *Disintegration.* The percentages are 3, 4 and 3. In neither the case of the pyramid (B (9)) nor of the key is decay marked to any significant extent by a 'falling apart' of the figure. There is reason to believe that in the few instances recorded the failure of continuity in the reproduction is due not to incohesion in the image but to accidents of drawing.

Table II. *Summary classification of changes.*

(Expressed in percentages of the total number of cases).

	Reproduction		
Type of change	1	2	3
Assimilation and omission			
Pyramid affected by key	0·4	1·5	3
Key affected by pyramid	10	13	15
Both in one drawing	0	0	0
Key omitted	0	1	0·3
Pyramid omitted	0	0·7	1
Reduction in size			
Pyramid	78	92	95
Key	66	73	78
Displacements			
Interchange	4	14	21
Key inverted or tilted	9	15	19
Chief points of instability			
'Strip trouble' in pyramid	54	71	76
'Loop trouble' in key	54	68	71
Tendency toward symmetry			
Equalizing strips (pyramid)... ...	39	52	56
Becoming square (pyramid) ...	10	13	40
Both loops reversed (key)	18	37	44
Both loops reversed or unchanged ...	64	69	73
Sharpening of features			
Exaggeration of zigzag	10	13	12
Only zigzag left	6	9	15
Over-emphasis on stalk	6	5	4
Over-emphasis on loops	5	7	5
Only loop-quality left	2	2	2
Levelling of features			
Under-emphasis on stalk	31	46	57
Under-emphasis on loops	18	31	38
Omission of oblique lines	0·3	4	8
Omission of central rectangle ...	0·3	2	3
Telescoping in key	7	9	8
Telescoping in pyramid	0	1	2
Disintegration (lines not closing)			
Pyramid	0·7	1	0·3
Key	3	4	3
Presence of curved lines			
Pyramid	0·3	1	0·3
Key	3	3	4
Simplification (in number of lines)			
Pyramid	0·3	8	8
Key	21	32	41
Elaboration (in number of lines)			
Pyramid	0	2	3
Key	13	12	9

(12) *Presence of curved lines.* This phenomenon occurred in only 3, 3 and 4 per cent. of the cases. It was even more rare in the reproduction of the pyramid (B (7)). Here again the hazards of drawing probably exaggerate the extent of this type of change.

Although the two stimulus figures are of very different shape it is not difficult to detect certain types of change common to both, and to summarize these (Table II) under headings that have significance for the theory of the alteration of imagery with the passage of time.

III. INTERPRETATIONS.

To a certain extent the classification in Table II is arbitrary. Gibson, for example, has pointed out that the same feature may be called sharpening or levelling depending upon the point of reference[1]. But even with the caution which this limitation necessitates, it is not difficult to recognize the following unmistakable tendencies in the reproductions, and with these any adequate theory of retention must deal.

(1) *The progressive nature of change and decay.* Köhler writes, "Traces are not rigid; there are definite dynamical tendencies in them[2]." The study reveals two senses in which this statement seems to hold true. In the first place, under virtually all of the headings there is a tendency for more and more cases to manifest the type of change in question as time elapses. This phenomenon seems to mean that there may commence at any time within the dormant memory material typical processes of change and decay. This deterioration sets in at various times during the retention without any apparent interference from without; it seems indeed to possess 'dynamical' and 'self-distributing' properties. In the second place, wherever studied in the present research, the tendency usually exists for a change to persist in a given subject's memory in the same direction in which it starts (cf. A (2), B (3)). It is, however, true that occasionally a trace takes a new form, and appears in quite a different shape in successive reproductions. But in either of these cases it is clear that the change must be conditioned by processes within the memory-activity itself.

(2) *Retention of two designs.* In no case did the two designs merge into one, and in very few cases was either omitted, and in no case were three or more drawn. The most elementary fact in the reproductions seems therefore to be the retention of *two* visual impressions, no matter how sadly their form may deteriorate.

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[1] Gibson, *op. cit.* p. 33.

[2] W. Köhler, *Gestalt Psychology*, 1929, p. 309.

(3) *Reduction in size.* More cases showed a shrinkage in the size of the image (as judged by the reproduction) than in any other single type of change. As many as 95 per cent. of the children displayed at least a 20 per cent. reduction in the size of their third drawing of the pyramid as compared with the original stimulus[1]. Among the associational factors that might be alleged to be operative are (1) the confining effect of the paper upon which the designs were reproduced (but this paper was either the same size as the presentation card or somewhat longer), (2) the habit of writing and perhaps of drawing in small dimensions, (3) a cautious or thoughtful attitude which produced constricted movement. None of these explanations, however, seems adequate to explain the fact that there was so frequently a *progressive* shrinkage in the size of the image from one reproduction to the next, or that more and more cases showed the shrinkage as time elapsed. The phenomenon seems to be more readily explained by the hypothesis that shrinkage with time is one of the definitely 'dynamical' properties of traces to which Köhler refers. Using much smaller figures, neither Wulf nor Gibson report such shrinkage. Hence this dynamical property seems to be confined to a certain (presumably ascertainable) range in the size of the stimulus[2].

(4) *Displacement.* Since a fifth of all the children in the third reproduction placed the key on the left instead of on the right, and a fifth inverted or tilted the key, it would seem that another dynamical property of traces is here disclosed. (Technical difficulties, such as fitting the designs to the page, may have accounted for some displacements, but scarcely for so many.) It is interesting to observe that the exact number of designs was virtually always retained, that the position of the designs in relation to each other remained correct in approximately four-fifths of the cases, and that the perfect form of the designs was retained in

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[1] H. K. Wolfe (*Amer. Journ. Psychol.* 1898, IX, 137–166) found that among 415 fourth-grade children, only 1 per cent. drew an American dollar bill from memory as long as the original, and only 4 per cent. as wide. In respect to age of his subjects and size of the stimulus object, his conditions are like those of the present study and his results similar.

He states, however, with considerable assurance a typical associational explanation for the shrinkage of the image: "The explanation of so large constant errors will occur to every one. We seldom see bills spread out at full size. They are generally folded..." (p. 156). The conditions of the present investigation rule out completely this naïve account of shrinkage.

[2] Using figures 10 mm. high, Meyer (*op. cit.* pp. 62 f.) found 16 per cent. of the children's reproductions became smaller and 35 per cent. larger; using figures 40 mm. high, 84 per cent. were smaller and none larger. Meyer considers this a striking result, since adults do not show so marked a tendency to decrease the size of figures, either large or small. The predilection of children for diminutive drawing, she finds, is less dependent than that of adults upon the size of the original stimulus.

only about 1 per cent. of the cases. These results seem to indicate that different aspects (number, position and form) of imagery possess different retentive value.

(5) *Unstable elements in the designs.* In the case of the pyramid it is clear that the greatest instability lies in the feature which is unsymmetrical, that is, in the lateral displacement of the inner rectangle. This situation does not have an exact counterpart in the key whose original form is perfectly symmetrical. In this design it is the loops which are the commonest source of error.

(6) *Tendency toward symmetry.* Perhaps the most striking of all the results is the tendency for the figure to retain, or to achieve, symmetry. Strips in the pyramid were equalized, and the rectangle became a square, with marked frequency, and very seldom was there a loss of the rectilinearity of the figure through the introduction of curved lines. In general, simplicity as well as symmetry was the rule, as shown in the relative absence of acute angles and elaboration; although the notion of an enclosed rectangle was tenaciously retained. In respect to the key, a marked tendency existed for the loops to finish the figure symmetrically, either by retaining their original direction or by achieving some new and equally symmetrical position. It is remarkable that, in the third reproduction, actually more cases had their loops in some symmetrical arrangement than in either the first or second reproduction. There can be no escape from the conclusion that one of the properties of the trace is for it to retain or to acquire symmetry[1].

(7) *Sharpening of features.* It is possible to consider a number of changes in the key as instances of 'sharpening,' or more exactly, in Wulf's term, 'pointing.' Among these the emphasizing of the zigzag quality of the design is conspicuous. The nature of the material probably prevented 'pointing' to a greater extent; broken lines, acute angles and marked asymmetry seem to be the conditions most favourable to this form of deterioration.

(8) *Levelling of features.* The commonest tendency in levelling is under-emphasis on the central stalk and in somewhat fewer cases on the loops. Under-emphasis on stalk is quite opposed to exaggeration of the zigzag quality; a single reproduction could hardly show both tendencies. Thus it seems, as Wulf points out, that some subjects 'point' and some 'level' the same feature, depending presumably upon the nature of their *Auffassung*[2]. In general it may be said that, in the course of deteriora-

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[1] Cf. p. 139, n. 1.

[2] Wulf, *op. cit.* p. 347.

tion, levelling is more frequently evidenced than sharpening, and this phenomenon accounts for the impression of growing simplicity in the successive reproductions.

(9) *Disintegration.* It can be stated with assurance that the decay of imagery is not normally marked by a falling apart of the figure. The change is characterized by an alteration in pattern and not by incohesion in the figure. Wulf and Gibson, too, have shown that unless a break appears in the original figure, no break will appear in subsequent reproductions of it; if a break does appear in the original, the gap will be either augmented or decreased in subsequent reproductions. Continuity of line in an unbroken figure, then, is another fact with which an adequate theory of retention must deal.

IV. THE GESTALT THEORY OF MEMORY.

Wulf found that without difficulty he could classify the great majority of changes under the headings of 'sharpening' (*Präzisierung*) or 'levelling' (*Nivellierung*). These two directions of change are accomplished, he thinks, through one or more of three agencies: *Normalizierung* (resemblance to familiar objects), *Pointierung* (exaggeration of a particular feature), *struktive Veränderung* (properties inherent within the Gestalt). One and all of these agencies of change Wulf considers to be factors in the achievement of *Prägnanz*, the tendency for every configuration in memory to become as 'good' as possible. Gibson quite rightly objects that 'normalizing' at least is clearly an associational phenomenon, and that *Prägnanz* is a totally ambiguous concept[1].

Gibson, finding so much 'object assimilation' (same as Wulf's 'normalizing') and also such clear evidence that the manner of the original apprehension of the stimulus frequently determines the type of retention, is inclined to believe that "the types of change here observed may all be explained by the supposition that the experience of the individual has brought into existence certain habitual modes of perception, and that these perceptual habits, rather than the laws of configurations, condition the changes observed[1]." Thus Wulf and Gibson, although working with similar material under similar conditions, arrive at virtually opposite interpretations of their results, the former favouring the Gestalt hypothesis, the latter the associational. The Gestalt school asserts that, even where associational assimilation is clearly found, the phenomenon is subordinated to the more inclusive laws of configuration, and the associationists make the reciprocal counterclaim. Thus both the new school and the old are at present trying hard to swallow each other.

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[1] Gibson, *op. cit.* p. 35.

On the grounds of parsimony (or at least tradition) it should perhaps, wherever possible, be conceded that perceptual set, associative context, various influences of habit, etc., modify and change the nature of the image and the reproductions. But in the present investigation there seem to be several findings that offer grave difficulty to any associational explanation: the persistence of change in the direction in which it starts, the spontaneous commencement of a change after a lapse of time, the equalizing of strips and the changing of the rectangle to a square, the preservation of the old, or the achievement of a new, symmetry in the position of the loops, the retention of an impression of two, the frequency of displacements, the continuous shrinkage of the image, the rigidity of the rectilinear form, the continuity or cohesion in each of the figures, the relative lack of elaboration, and the tendency toward simplification. Still another feature, too subjective to sustain much weight, and yet important, is the fact, not previously mentioned, that the recognizability of a design often remained even though every portion of it was incorrectly reproduced.

The associationist might, it is true, dispose of some of these tendencies by invoking the aid of his familiar categories. He might, *e.g.* say that the urgency with which the image acquires symmetry is somehow related to associative predispositions that arise from the bi-lateral symmetry of the body. The exact operation of such an associational process is, however, quite as dim as is the hypothetical *Gestaltdrang* toward symmetry. Nor does it seem that attention or perceptual set aid materially in explaining the various types of change listed above, since the question immediately arises as to why symmetry, continuity, simplicity, rectilinearity, etc., are factors of advantage in the original perception. Then too there is the troublesome evidence that changes frequently occur *after* the first or second reproduction, thus indicating activity and change within the memory (and not in the perceptual) process itself.

Unquestionably the stimulus material itself largely conditions the changes that occur in the image. For example, the designs in the present study were accompanied by marked shrinkage in the successive reproductions, whereas neither Wulf nor Gibson, using much smaller stimuli, report such a change. The work of Meyer (cf. p. 144, n. 2) has already shown that this phenomenon of shrinkage stands in some ascertainable relation to the dimensions of the stimulus figures. And again, 'object assimilation' is a frequent type of change arising from the somewhat ambiguous and amorphous figures used by Gibson and Wulf, whereas the firmly knit figures employed in the present study allowed no such associational fusion.

Although in the light of our findings, Köhler's principle of the dynamical properties of traces suggests itself as the most fruitful hypothesis in dealing with change and decay in the memory image, it is desirable to know precisely what these properties are and under precisely what conditions they become operative. Certain changes have been encountered by a number of investigators under a wide variety of conditions, *e.g.* tendencies toward symmetry, toward exaggeration or levelling, toward greater cohesion and rectilinearity; and still other alterations have been discovered in the present investigation. But until these changes have been checked and thus finally established, and the conditions for their occurrence exactly defined, the so-called 'law' of *Prägnanz* will remain vague and unsatisfactory.

V. SUMMARY.

Changes in the images of 275 children, as revealed in their reproductions of the Binet (X, 3) designs after intervals of 2 weeks and of 4 months, as well as immediately after the exposure, indicate that certain typical alterations occur during the period of retention. The images tend, in general, to become smaller, more symmetrical and simpler. The number of designs is correctly retained, also their essential shapes; there are many variations in respect to detail, some of which can be classified as 'sharpening' or 'levelling' of special features. In general, it may be said that although very few are perfectly retained, the figures do not disintegrate nor lose their identifiability.

It seems to be a reasonable hypothesis that there are dynamical processes in the brain which during retention force memory traces into typical lines of change, but to state that these processes lead inevitably to 'goodness' in the image is merely to obscure the issue. Only by listing the specific tendencies and the conditions for their occurrence, as in the present report, can the concept of *Prägnanz* secure definition, and the laws of the phenomenology of the memory image be formulated.

(*Manuscript received* 8 *April*, 1930.)

EMOTIONS IN TERMS OF THE GALVANOMETRIC TECHNIQUE[1]

By CHRISTIAN A. RUCKMICK.
(*University of Iowa.*)

I. *Statement of the problem* (pp. 149–151).
II. *Summary of earlier results* (pp. 151–154).
III. *Experimental method* (pp. 154–155).
IV. *Discussion of results* (pp. 155–156).
V. *Suggested improvements in technique* (pp. 157–158).
VI. *Summary* (p. 159).

I. STATEMENT OF THE PROBLEM.

MOST investigators in the field of the affective processes are aware of the historical development of the expressive method in psychology. They know that the peculiar nature of these mental processes demands the use of two indirect procedures. While in our laboratory we have been successful so far in obtaining introspective accounts of some of the typical emotional experiences, reliance is also being placed on the registration of physiological effects that take place simultaneously. The fundamental reason for this stress seems to lie in the accepted fact that emotional experiences, more than any other, are accompanied by a considerable and widespread disturbance in the body. With this assumption we have rigorously to guard against the notion that these disturbances are themselves equivalent to the emotional experiences. The author has already protested against this interpretation, and has taken the stand that emotions are still, at least in part, liveable experiences in the human mind and probably also in the mind of other higher vertebrates[2].

The second indirect procedure is the impressive method usually developed in terms of affective judgments in regard to objects presented by the technique of paired comparisons. Since the latter method has developed quite independently of the former, we shall not discuss it here.

With the knowledge of the historical development of the physiological methods, careful research students will want to avoid the pitfalls which have beset previous investigations, involving various forms of bodily expression. It is altogether obvious that, heretofore, too much was expected from the graphic results thus obtained. Many of us suspected that, as the result of such procedures, the Wundtian tridimensional schema was all too neatly and too logically developed to withstand the stress of continued criticism[1]. The results of this investigation were not, even at that time, unequivocal. They suffered serious consequences, moreover, at the hands of subsequent workers. One of the largest sources of error lay in the fact that physiological processes are influenced by a variety of conditions outside of the affective responses. If we proceed cautiously we shall be able in time to factor out some of these conditions, but we certainly must not draw sweeping conclusions because the curves obtained seem to be so definite and so plausible.

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[1] Read at the fourth annual meeting of the Mid-western Psychological Association, Urbana, Illinois, May 10th, 1929.

[2] C. A. Ruckmick, "Why we have emotions," *Scient. Mo.* 1929, XXVIII, 261.

As the physiological sciences have developed and physiological techniques have been provided, definite strides have been made in the direction of greater refinement of the method of expression. As the author has pointed out[2], it seems as though the psychologist has eagerly sought any new techniques which have been developed in physiology that seem promising for his own researches.

A great variety of physiological changes have been seized upon as offering an explanation of emotional expressions. Recently, with the common reduction of most physical phenomena to electrical changes and the great development in amplifying minute electrical discharges, there has come about a renewed faith in the galvanic reflex. The galvanometer has itself also been perfected and developed in the direction of photographic recording. Hathaway has furthermore developed a portable instrument which amplifies, through oscillating wave circuits, the output of electrical energy from the body[3]. One distinct advantage in most of these galvanic records is the appearance of the latent period which seems to mark off an affective, or what R. J. Bartlett terms an 'orectic,' response from muscular contractions *per se*[4]. Another advantage lies in the fact that this electrical energy is apparently not under the voluntary control of the observer.

A considerable amount of work has been done on the problem of the probable physiological cause for the electrical discharge. Clearly this is chiefly a problem for the physiologist himself. While psychologists are interested in the question and will do their share in arriving at a solution, it is not necessary to understand the mechanism of the galvanic reflex in order to obtain results significant for psychology. The writer is aware, of course, that some of the underlying conditions of the reflex affect the techniques, such as proper electrodal connections, but further experimental investigations in the psychological laboratory do not have to wait upon these fundamental considerations of the source of the electrical endosomatic changes before results can be announced.

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[1] N. Alechsieff, "Die Grundformen der Gefühle," *Psychol. Stud.* 1907, III, 156 ff.

[2] *Op. cit.* p. 260.

[3] Designed by S. R. Hathaway, Athens, Ohio.

[4] R. J. Bartlett, "Does the psychogalvanic phenomenon indicate emotion?" *Brit. J. Psychol.* 1927, XVIII, 30–50.

With this situation well in mind it is our purpose to summarize the chief results thus far obtained both by way of experimental data and in terms of improved technique. While credit is given, of course, to some of the outstanding achievements made in other laboratories, we hope to describe the status of emotion as developed in terms of research in our own laboratories at the University of Iowa. It will be understood that the material thus reviewed is subject to the usual scientific condition of further experimentation and criticism. While we have made more than two hundred introspective analyses of various types of emotions and moods together with the corresponding expressive galvanic records for many of them, we have made only a small beginning in this field of activity. Much remains to be done. If the progress so far has been slow we must not forget that much time, energy, and thought has gone into the arousal of real emotions and moods under laboratory conditions. The reports show that our observers have spontaneously attested to the reality of the emotions produced. It is the writer's intention to summarize, on a later occasion, the qualitative reports from our observers. The present paper will be devoted mainly to the galvanometric technique.

II. SUMMARY OF EARLIER RESULTS.

We may say first of all that the curves of deflection, especially those obtained from various types of sensitive galvanometers, show such typical characteristics for emotional processes that they can be easily distinguished on the whole from curves which seem to be due to general muscular contractions or to other physiological disturbances not directly correlated with the affective life. If careful records are kept of the incidence of the emotional stimulus or situation and the onset of the emotional processes in the observer, a typical initial latent period will invariably occur. This has been found by many other investigators in the field and lasts 5 to 12 seconds from the moment of arousal. Just what this latent period means is a physiological problem that has not yet been solved. It occurs also with the Hathaway apparatus but we have not yet graphically recorded it in the same way. The accompanying figure illustrates a typical instance.

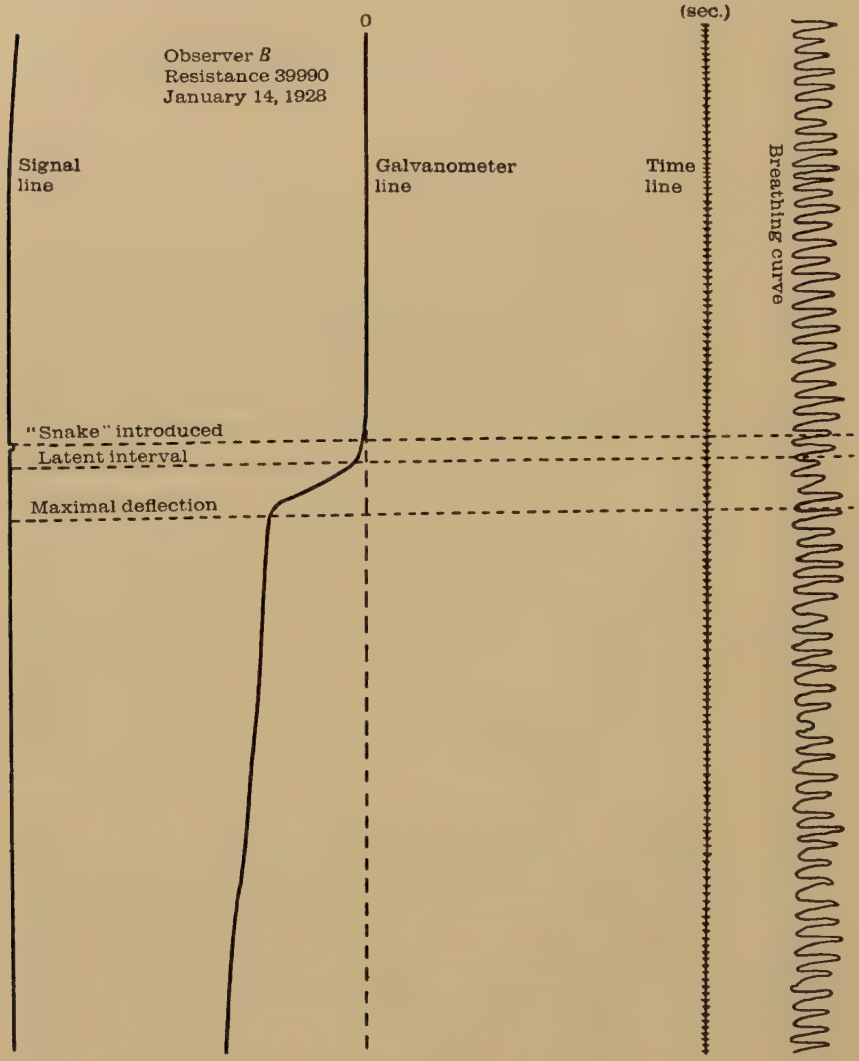

Fig. 1.

The second almost uniform characteristic of the curve is its initial, rapid change of direction. This movement in most of our records takes place to the left, indicating a very quick reduction of electrical resistance in the body. We are frank to confess, however, that in a few cases, which are so far anomalous, the deflection has occurred to the right under fairly identical conditions. As a rule, after the wide excursion at the beginning, there are then no further prominent deflections in the original direction. Gradually the curve turns to the zero line, sometimes with one or more prominent humps.

All of our studies carried on in many different directions so far clearly reveal the fact that there is a high general correlation between the introspectively reported intensity of the emotion and the amplitude of the deflection. It is to be understood, of course, that the observers are kept in ignorance of the records obtained. Under these circumstances it is rather significant to note that at the present stage of our knowledge we can directly indicate the approximate intensity of the emotional processes. A further qualification of this point will be made later in connection with the higher emotions or the sentiments, but no qualification need be entered for the primitive emotions.

In a preliminary way we can say that certain types of curves tally in form or contour with certain emotional experiences. This comparison has not succeeded nearly as well as we had anticipated, but Bayley has shown that two types of fear, namely, startle and apprehension, may be distinguished to a certain extent on this basis[1]. It is very likely that, when we continue studying these and similar emotions more closely, we shall find that the graphic record showing such differentiations depends upon inherent characteristics in the respective emotional experiences. These elements may be factored out through the introspective records. In this way our results indicate that some of the names for emotional states represent differences in intensity, in temporal course, and in ideational content, all in terms of its general pattern or scheme. But we have not enough data at present to clinch this conclusion.

Taking as our cue the historical fate of the expressive method when based upon respiration and circulation, we have also attempted to study the effect of some general bodily conditions as manifested through the so-called galvanic reflex. The experimental investigations made by Bayley and later by Patterson had already suggested that the total bodily resistance was affected by conditions of mental and physical fatigue[2]. The introspective records had previously given us hints in this direction through reports of alertness and euphoria and their opposites.

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[1] N. Bayley, "A study of fear by means of the psychogalvanic technique," *Psychol. Monog.* 1928, xxxviii, No. 176, pp. 31–33 (Univ. of Iowa Stud. in Psychol. No. xi).

[2] N. Bayley, *op. cit.* pp. 26, 27; E. Patterson, "A qualitative and quantitative study of the emotion of surprise" (published in Univ. of Iowa Stud. in Psychol. No. xiii).

III. Experimental method.

The writer therefore undertook a series of experiments in order to verify these cues. Seven observers were used for both the normal and the fatigue series, but the main series was finally conducted principally with two observers. The technique involved mental fatigue induced by long arithmetical problems and a series of searching questions in psychology and other tasks done under high pressure with threat of electrical shock or intensive scolding as punishment for failures made and the alternative of physical reward, such as refreshments, for successful solutions. Although there was a slight reduction of resistance in most cases, this series involving mental fatigue only did not indicate enough change of resistance to be significant. Consequently a series of experiments was undertaken to determine the effect of physical fatigue on bodily resistance. These trials were carried to the point of almost complete physical and mental exhaustion. The method involved the use of the algometer on the lips and the mucous membrane of the nose. Electric shocks as strong as could be stood were also used in the series. The main portion of the series consisted of rather strenuous setting-up exercises such as raising and lowering the body from a table in the horizontal position and continued running 'in place.'

Detailed reports were taken showing some very significant features of fatigue. The following are typical:

(B) Attention distracted by solution in mouth; choking. Smarting of eyes. Strain in muscles in arms and shoulders, like weight pressing down. Also in legs, especially thighs. Feeling of relaxation, of lassitude throughout. Smarting of eyelids continued with quivering of chin. Subvocal idea—"Heavens, I must be tired. I never cry when I am not." Pressure of back of chair on my back. Heaviness of head. Could hardly hold it up. Unpleasant but not decidedly so. Feeling of 'detachment.' Spasmodic contraction of muscles in chin, throat and lower lip. Combatted by setting teeth, holding jaw tense, *etc.*, but lack of control. General attitude—if crying came it wouldn't matter. Besides kinaesthetic sensations of feeling heavy. Half formulation ('way, way down') of answers to offending remarks (scolding). Vague, very vague resentment, but it did not matter much one way or another.

(D) Feeling tone indifferent. Kinaesthetic sensations from eyelids extremely heavy. Drawn in corners. Not easy to open. Lips felt parched. Pressure sensations from mouth which hung open. Lips felt thick. Ideational material very sparse. The same material but repeated and repeated. Words repeated slowly and rhythmically. No noticeable visual imagery present. Mind sterile of ideas.

(F) Quivering sensations. "I had a hard time keeping still before the camera. More 'doggone' tired than have been for long time." Eyelids closed with considerable pressure sensations in inside. Vague tendency toward dizziness. Top of head felt heavy with a sort of gradual 'squelching' pressure. Dry tactual sensations in lips and throat. Forehead felt pinched. Breathing very slow and measured, also pressure sensations across shoulders, but in terms of verbal ideas commented on fact that rest of body didn't seem directly tired, though could hardly move from top of table. Not pleasant or unpleasant. Sheer indifference.

IV. RESULTS.

The interesting feature of the results lies in the consistent decrease of bodily resistance during fatigue when this is measured by the galvanometer. Under the same conditions, however, the Hathaway apparatus shows increasing bodily resistance in many instances. We are not quite sure what this difference in the two types of recording fundamentally means. It is worth pointing out, however, that the Hathaway apparatus records changes in the flow of an alternating current while the galvano-

Table I. *Normal* v. *fatigue conditions.*

	Galvanometer				Hathaway			
O.	N.	F.	D.	±	N.	F.	D.	±
A	3500	2600	900	–	37	50	13	+
A	2600	900	1700	–	60	37	23	–
A	1600	900	700	–	32	39	7	+
B	4500	2600	1900	–	39	12·5	26·5	–
C	3300	2500	800	–	30	40	10	+
C	2500	1300	1200	–	43	38	5	–
D	2500	1500	1000	–	51	42	9	–
D	4000	3300	700	–	30	33	3	+
D	2200	1300	900	–	35	44	9	+
D	4100	2900	1200	–	40	47	7	+
D	1420	990	430	–				
D	1500	1300	200	–				
D	...	...	...	...	88	112	24	+
D	...	...	...	...	94	138	44	+
E	1150	1130	20	–				
F	2949	2620	329	–	143	160	17	+
F	2070	1550	520	–	31·7	36	4·3	+
F	3290	2230	1060	–	30	28	2	–
F	3100	2100	1000	–	41	47	6	+
F	4300	2600	1700	–	40	29·5	10·5	–
F	2510	2300	210	–				
F	9500	8100	1400	–				
F	3050	2610	440	–				
F	...	...	...	...	95	104	9	+
F	...	...	...	...	90	115	25	+
F	...	...	...	...	62·5	40	22·5	–
F	...	...	...	...	46	50	4	+
F	...	...	...	...	55	78	23	+
F	...	...	...	...	30	32	2	+
F	...	...	...	...	39	51	12	+
F	...	...	...	...	24·5	27	2·5	+
G	4200	2700	1500	–	36	37	1	+
G	4600	2400	2200	–	36	34	2	–
G	2800	2000	800	–	35	33	2	–
G	3500	2700	800	–				

O. observer. N. normal condition. F. fatigued condition. + increase of bodily electrical resistance. – decrease of bodily electrical resistance. Galvanometer readings in terms of units of 10 ohms. Hathaway readings are potentiometer units on an arbitrary scale.

meter registers changes in a direct current. It follows, therefore, that there may be a distinction between endosomatic and ectosomatic current. In the Hathaway apparatus the lowering of endosomatic current may show increased resistance to alternating pressures, but we are not sure. In those series in which both the galvanometer and the Hathaway apparatus were used simultaneously we again obtained opposite results. These results may throw some light on the underlying cause for the galvanic reflex. The above table indicates the resistance obtained under these conditions.

There was also a rather consistent lowering of resistance on the part of three observers in another series when the right arm was outstretched in a horizontal direction and kept as long as possible in that position. The following table will indicate these results at successive intervals.

Table II. *Right arm outstretched.*

(Wheatstone bridge settings with galvanometer at zero in units of 10 ohms.)

O.	N.	0″	2″	4″	6″	7″	8″	10″
E	1150	1130	1090	1070	1050	—	1040	1020
B	2520	2320	2140	2050	1600	1520		
A	900	900	830	810	810			

Some short series with a number of observers indicate also that bodily position changes the total resistance. Experiments show that resistance is lowered when the body is in a prone position as over against the usual sitting position. Further work needs to be done in these directions but the indications so far are clear.

Another factor which developed throughout our trials was the significance of gross bodily processes *v.* ideational contents. Emotions which had strong bodily accompaniments, such as muscular or organic sensations, uniformily gave us large deflections. Emotions which are rather poor in such processes but rich in ideas that became affectively coloured, gave us relative scant deflections. This had already been mentioned in the Bayley and Patterson studies and has been noted in a recent article by Wiersma[1]. It appears, therefore, that the galvanometer after all responds more definitely with emotional responses of the primitive sort and less with sentimental experiences or emotions with a considerable ideational background and not primarily of an instinctive sort.

[1] E. D. Wiersma, "On the value of the simultaneous registration of the plethysmogram and the psychogalvanic reaction," *Kon. Akad. v. Wet. Amster.* 1915, vii, 18. For an excellent review of this point see C. W. Darrow, "Differences in the physiological reactions to sensory and ideational stimuli," *Psychol. Bull.* 1929, xxvi, 185–201.

V. SUGGESTED IMPROVEMENTS IN TECHNIQUE.

Some work which we have recently undertaken in connection with the playing of checkers or 'drafts' has brought out this difference very effectively. At the beginning of the game where introspections revealed considerable excitement in anticipation of the game with large bodily complexes involved, we usually found wide deflections of the milliammeter readings on the Hathaway apparatus. Later on, when the game became definitely intellectualized and the attention of the observer was directed to the solution of problems, the milliammeter settled down to

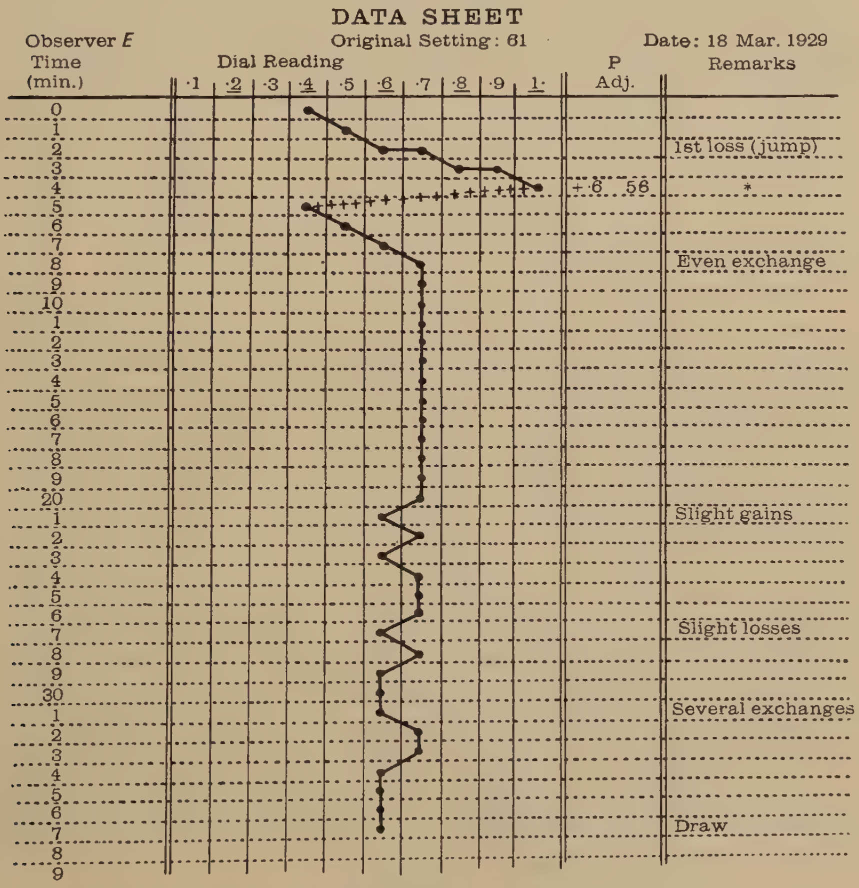

Fig. 2.

* When the milliammeter indicator of current passes off the scale it is brought back by readjusting the potentiometer.

a central position and stayed there with relatively little movement until the end of the game. This is shown in the accompanying diagram.

New improvements have also been made in the direction of better electrodal connections. We have already published descriptions of previous improvements[1]. But recently we have developed a band for the left hand which is particularly suitable for the Hathaway apparatus. The metallic contact is made through two plates made of very thin copper, 32 mm. square, stitched on fairly thin kid leather about 3 mm. apart. This leather forms a flap about 8 cm. long by 6 cm. wide which is stitched on to a longer band of about 15 cm. so that it leaves a free edge on one side. The longer band is furnished with two straps and two buckles and has a small piece cut out to fit around the thumb. Between the flap and the larger band a small piece of sponge rubber is inserted. Leads to the two copper plates are brought out, so that an ordinary lamp-cord with clip attachments can be connected to them. The other end of the lamp contains a standard radiophone plug.

When the band is strapped tightly to the left hand it is very comfortably worn and leaves the hand free for other work without disturbing the original pressure and area of contact. Of course the usual care in cleaning the copper plates and the palm of the hand with 95 per cent. ethyl alcohol should be exercised. After a preliminary period of about three minutes under normal conditions it will be found that the maximal degree of humidity from perspiration is reached. This will, therefore, vary but little throughout the experiment. The particular advantage of the contact in addition to the question of pressure and area lies in the comparative mobility of the hand over a long period of time, especially when the clips of the connecting cord are removed. The practised observer ordinarily is not distracted by wearing the electrode since it fits so comfortably that it virtually becomes part of his wearing apparel.

Another problem on which progress can be reported is the question of quick recording of results. A chart has been devised by means of which a rapid record can be taken of the deflections made by the pointer on the dial by the milliammeter. A specimen chart from a typical checker game has been shown above (Fig. 2).

We are still formulating plans for a photographic recording of the moving pointer, but for most of our situations the manual record is sufficient. Our most promising line of attack is to amplify the current still further so that it will actuate a moving optical lever.

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[1] C. A. Ruckmick and E. Patterson, "A simple non-polarizing electrode," *Amer. J. Psychol.* 1929, XLI, 120.

VI. SUMMARY.

By way of summary we may then conclude that the galvanic reflex, when properly safeguarded against both uncontrolled conditions within the body that are foreign to the emotional situation and the fortuitous factors in the electrodes, affords us a promising approach to a quantitative and graphic analysis of the emotional life. At the same time we have not overlooked the opportunity of training our observers to make careful analytical descriptions of their experiences during even the most intense emotional crises. The accounts by way of the method of expression are then made to run parallel with qualitative analyses. The writer believes that the main hope of the psychology of emotion, in the face of a rather troublesome past, lies in this direction. Our returns so far are necessarily scant and provisional, but we can say with some degree of certainty that we have a means of graphically recording the temporal course of an emotional process with its intensity closely corresponding to the amount of variation in bodily resistance. We may say further that the most primitive and instinctive emotions, *i.e.* those having large bodily components in terms of kinaesthesis or organic sensations, more definitely show graphic disturbances; emotions that are full of ideational material, on the other hand, give much more reduced deflections. In any case the disturbances accompanying emotional experiences can ordinarily be distinguished from bodily responses as a whole through the appearance of the initial latent period followed by a rapid incidence of the curve of deflection.

As soon as we have enough material to give assurance that the disturbing factors are brought under control we shall be in a position to pursue our research in many directions such as musical appreciation, dramatic performance, public speaking, and the effects of the cinematograph on children and adults. History teaches us, however, that we should proceed cautiously and at our own risk because the road to our goal is "under construction ahead" and is being "kept open only for the convenience of the [professional] public."

(*Manuscript received* 10 *October*, 1929.)

A FURTHER ATTEMPT TO MEASURE THE STRENGTH OF INSTINCTS

By EMILY N. KENDREW.

(*Morley Memorial School, Cambridge.*)

I. *Introduction* (pp. 160–161).
II. *First group* (pp. 161–168).
  (*a*) *Description of experiment* (p. 162).
  (*b*) *Results* (pp. 163–164).
  (*c*) *Notes on children's behaviour* (pp. 164–168).
III. *Second group* (pp. 169–172).
  Results (pp. 169–172).
IV. *Comments and conclusions* (pp. 172–173).

I. INTRODUCTION.

SOME time ago an article appeared in *The Forum of Education* describing an experiment which attempted to measure the strength of instincts[1]. The subjects of the experiment were given a list of words calculated to arouse certain instincts, and were told to say at once whatever occurred to them on reading each word. The nature of the reply and the rate at which it followed the word-stimulus were supposed to indicate the intensity of the emotional response. At the same time, a psychogalvanometer recorded any 'thrills' the subject might be experiencing. The emotional response secured by this double method was used as a basis for measuring the strength of the instinct stimulated.

Shortly after Dr A. C. Garnett wrote in this *Journal* on "A conative criterion for the discrimination of instincts[2]." Here he claimed that conation is the distinguishing mark of an instinct. But if this be so, *i.e.* if conation rather than emotion is to be the criterion by which instincts are discriminated—why not use the former rather than the latter as a basis in attempting to measure their strength?

A conative process, in other words, the type of behaviour aroused by an impulse and tending to continue until the impulse prompting it is satisfied, may include various forms of activity. Quite often, some of these involve skill. 'Skill' is used here to mean manipulative dexterity depending upon muscular control and the accuracy of visual perception.

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[1] Allman and McRae, "An attempt to measure the strength of instincts, Nov. 1927.
[2] Jan. 1928.

It is possible to compare degrees of skill and to measure any improvement which occurs. Improvement in skill is, generally, the result of practice, but experiments have suggested that incentives may bring about a similar result. An incentive, presumably, makes the hand more cunning and, like love, "adds a precious seeing to the eye." If, at the same time, the incentive is calculated to arouse some instinct, may not the improvement shown bear some relation to the strength of the instinct aroused? Further, supposing the improvement in skill is accompanied by alteration in speed, for example, or by other changes indicating increase of interest or effort, may not these changes afford further evidence which can be used in attempting to measure the strength of instincts?

On the other hand, increased effort if tinged with anxiety will probably impair skill, but this fact does not weaken the above hypothesis, for behaviour expressing anxiety, although it may lead to inefficiency, may also be taken as indicating the strength of the instinct aroused.

The following experiment is an attempt to work out the idea of using a conative basis for the measurement of instincts. The test used is a simple one: piling up dominoes one upon the other. The height of the pile is taken as representing the level of skill. (This does not mean that it represents only skill; other qualities related to Temperament and Character are also involved, but no attempt is made here to consider them.)

II. First group.

Subjects. Eight children from the Demonstration School, Homerton College. (Seven girls and one boy.)

	Age		Mental age*		
	Years	Months	Years	Months	I.Q.*
Freda	6	2	6	6	105
Clare	6	2	6	4	102
Margaret	5	4	5	2	98
Hugh	5	2	5	4	103
Jean	5	0	5	8	115
Marjory	4	2	5	7	134
Ruby	4	2	3	8	88
Evelyn	3	10	5	6	145

* According to the Terman revision of the Binet-Simon tests.

Incentives. Showing the order in which they were applied: Competition; Food-seeking; Curiosity; Self-competition.

(*a*) *Description of experiment.*

The children were tested separately. The dominoes were put in a shallow box at an easy distance from the child's right hand. At the beginning of the first test the child was told to "put the dominoes one on top of another, like this (one was laid flat on the table) and see how big a pile you can get." Five piles were built in each test; every child had seven tests, separated by at least one day's interval. The first three were for practice; no suggestions as to the best way to pile up the dominoes were given, but by the end of these each child had developed its own method of building, which was employed with very few variations during the rest of the experiment. Then followed the four incentive tests in the order given.

The results of the practices will be compared with those of the incentive tests later.

The incentive tests were conducted in the following way.

Competition. Two children worked together. Frequent suggestions were made that each should try to beat the other by getting a higher pile.

Food-seeking. The child was shown a plate of walnut macaroons of various colours and allowed to choose one. This was placed on the top of a column of bricks in front of her. The column was a little higher than the highest pile she had built as yet. She was told that she was to have the macaroon if she made a pile that would reach it.

Curiosity. A parcel containing a toy xylophone was suspended over the table at which the child worked, at a similar height to that used for the previous test. She was led in blindfold, placed in the chair and her eyes uncovered. If she could build up to the parcel she might open it! During this test, several attempts were made by the experimenter to reinforce the stimulus. After the first trial the visit to the toy-stores and the difficulty of finding something really wonderful was described. After the second the anticipated pleasure of opening the parcel was discussed in great detail. After the third the child was allowed three guesses as to what was in the parcel, and when she began again after the fourth she was told this was her last chance.

Self-competition. Here an average was taken of all the child's previous results. A red column, representing the height of this was marked on a strip of white paper and pinned up in front of her. She was told she had already built as high as the red part, and was asked to see if she could get above it. Any increase was to be marked on the strip of paper and coloured in by the child herself.

(b) *Results.*

The figures represent the number of dominoes in a pile.

Table I. *Last practice test.*

	Trials					Average score
	1st	2nd	3rd	4th	5th	
Freda	25	19	19	25	21	21·8
Clare	22	20	19	18	23	20·4
Margaret	17	12	20	26	10	17
Hugh	27	28	30	20	26	26·2
Jean	30	10	18	19	14	18·2
Marjory	16	11	22	9	21	15·8
Ruby	15	7	11	5	5	8·6
Evelyn	18	19	16	4	25	16·4
					Average	18·05

Table II. *Competition.*

	Trials					Average score
	1st	2nd	3rd	4th	5th	
Freda	15	20	21	18	14	17·6
Clare	30	20	15	23	14	20·4
Margaret	17	20	24	18	25	21·8
Hugh	24	15	27	17	23	21·2
Hugh	30	27	20	20	30	25·4
Jean	14	22	27	23	18	20·8
Marjory	32	23	16	18	13	20·4
Ruby	13	16	6	9	22	13·2
Marjory	19	18	17	15	14	16·6
Evelyn	22	19	11	24	12	17·6
					Average	19·5

Table III. *Food.*

	Trials					Average score
	1st	2nd	3rd	4th	5th	
Freda	30	20	15	27	26	23·6
Clare	23	19	20	15	15	18·4
Margaret	21	35	18	19	28	24·2
Hugh	28	30	30	22	23	26·6
Jean	20	22	19	27	30	23·6
Marjory	20	21	27	24	15	21·1
Ruby	9	20	23	25	16	18·6
Evelyn	26	19	21	27	25	23·6
					Average	22·5

Table IV. *Curiosity.*

	Trials					Average score
	1st	2nd	3rd	4th	5th	
Freda	20	24	21	22	28	23
Clare	24	21	22	15	18	20
Margaret	24	30	17	22	18	22·2
Hugh	22	30	30	26	27	27
Jean	17	30	30	24	32	26·6
Marjory	33	14	25	22	28	24·4
Ruby	8	12	18	12	17	13·4
Evelyn	21	24	20	22	14	20·2
					Average	22·1

Table V. *Self-competition.*

	Trials					Average score
	1st	2nd	3rd	4th	5th	
Freda	23	24	21	29	17	22·8
Clare	19	18	18	23	24	20·4
Margaret	28	21	26	25	27	25·4
Hugh (absent)	—	—	—	—	—	—
Jean	20	12	18	23	21	18·8
Marjory	26	19	23	28	28	24·8
Ruby	13	19	25	12	13	16·4
Evelyn	22	21	19	11	19	18·4
					Average	21

Table VI. *Showing the average for each child in each test.*

	Practice	Competition	Food-seeking	Curiosity	Self-competition
Freda	21·8	17·6	23·6	23	22·8
Clare	20·4	20·4	18·4	20	20·4
Margaret	17	21·8	24·2	22·2	25·4
Hugh	26·2	21·2 25·4	26·6	27	—
Jean	18·2	20·8	23·6	26·6	18·8
Marjory	15·8	20·4 16·6	21·1	24·4	24·8
Ruby	8·6	13·2	18·6	13·4	16·4
Evelyn	16·4	17·6	23·6	20·2	18·4

Table VII. *Giving the average score for each incentive and the highest pile built.*

	Average score	Highest pile
Practice test	18	30
Competition	19·5	32
Food-seeking	22·5	35
Curiosity	22·1	33
Self-competition	21	29

The scores shown in Table VII might possibly be dismissed as follows: increase up to food test—improvement due to practice, followed by decrease of score due to boredom! But further work with more children and the incentives taken in varying order is necessary before it is at all possible to estimate the significance of practice and boredom respectively. Table VII also shows that the variations in skill from test to test as indicated by the average scores made are very slight, but the significance of the variation in average score is borne out by the variation in the behaviour of the children during the tests. The following notes help to bring this out.

(*c*) *Notes on children's behaviour.*

Food-seeking. It will be seen that the highest average score and the highest actual pile were both reached during this test, which also showed less variation between the average scores of the children: three had an average of 23, two had one of 18.

Notes on behaviour taken during the test show that many of the small scores made during this test may be accounted for by anxiety; as when Marjory at the beginning of her fifth attempt—which resulted in a pile of 15—gave a great sigh on being told she had just one more try, seized a handful of dominoes, knocked two off her little pile, jerked a few more on and gave a general impression of agitation; or, as in Clare's case, when her hand was trembling during the last two trials which made 15 and 15 respectively. Freda during the 20 and 15 trials could not leave her pile alone, but adjusted and readjusted the whole of it each time she added another domino. Hurried movements, shakiness and fussiness, although they retard skill, are nevertheless signs of effort and therefore have value as evidence in this experiment.

With a few exceptions which will be mentioned shortly, the behaviour of the children generally throughout the whole of the test expressed interest and effort. While they were busy with the preliminary practices there was a considerable amount of irrelevant talk: Evelyn gave an account of her mother's visit to a jumble sale; Margaret reminded me of our meeting on the bus on the previous day, and later described the various dainties she had brought with her for lunch: "Got an orange for my lunch and a piece of choc.," etc., but in face of the food incentive very little was said and every remark was related to the business in hand. Many of them ran something like this: "Nearly up to it now"; "I'm getting near" (in a whisper); "If I get up there!" (pointing to the goal); "Got it a bit crooked"; "Not coming down yet"; "Look how big the thing is"; and Jean exhorted her pile to "Keep up, Mister, Oh, do keep up or I shan't get my sweetie. Don't fall down yet." Ruby's interest was very evident. During her practices she had said: "Wish I wasn't to do them"; "Wish I went off now"; "Can I go?"; and on being told that the next trial was her last she deliberately got a handful of dominoes, dropped them on her pile, and when it fell on reaching the height of five announced "I've done it," *i.e.* finished my last pile. But this time, when she had finished the test and not got her macaroon, she looked at me with: "You said that was the last one. Is there *only* the last one?" The children looked constantly at the goal—now and again with a sigh—some of them even kept their eyes fixed on it while they reached for more dominoes, and one little girl got her pile partly up before she could take her eyes off it. This last mode of behaviour may be contrasted with a certain amount of gazing round which took place during the practices.

Many examples could be given of how the incentive aroused the children to greater effort and to more careful work; one placed her pile well back on the table and eyed it carefully before adjusting any irregularities; Clare bent her head so that her eyes were level with each domino as she placed it; Freda held each one with both hands over the pile and steadily lowered it, while Ruby held on to the bottom of her pile with the left hand in a—usually vain—attempt to keep it up till it was really high. Every child placed carefully and made some attempt at adjusting.

Some changes in speed were noticeable. In one practice test Evelyn had spent 3 min. 50 sec. on a pile of 25—her excursions into regions remote have already been mentioned, and they took time!—but during this test she was never longer than 1 min. 50 sec., whereas Marjory, because of her greater carefulness, now spent from 1 min. 30 sec. to 2 min. on each pile instead of always being under the minute as previously. Why the same stimulus should act with one child as an accelerator and with another as a brake may be explained as follows. In the former case the interest which has been aroused is strong enough to hold its own against all intruders which would claim attention and so waste time; in the latter the desire to reach the goal makes the child more careful and consequently more deliberate. That the children react in opposite ways to the same incentive is evidence of temperamental differences between them.

The exceptions to the general type of behaviour illustrated above were the cases of Margaret and Hugh. The former had her turn late in the morning, and after her second trial heard the children in the cloak-room preparing for home. She began her next trial with the remark, "They're going home now, ain't they?"; and her third and fourth scores were 18 and 19 as against 35 for her second. She pulled herself together for the fifth after I had impressed upon her that it was her last chance and reached a score of 28. Hugh, after his third trial, became rather indifferent and began to talk: "Miss Kendrew, I've got a book at home of lions and bears. I'll bring it to school," etc., etc., with the result that his scores fell from 30, 30 to 22, 23.

Curiosity. The numerical difference between the results of the Food-seeking and Curiosity tests is very small, but nevertheless significant, since the decreased score is accompanied by behaviour showing less interest and giving fewer examples of effort. Freda placed rather carelessly and ignored a curve which brought her pile down at 21. Clare scarcely looked at the object, and Margaret stared round and did not trouble to adjust. Evelyn showed a tendency to go back to her dilatory practice-test ways; she played with the dominoes before placing them:

put a handful into her lap and took from there and the box alternately and so managed to spend 2½ min. on a pile of 20. In her last trial she took no notice of irregularities at the base of her pile, with the result that the score was only 14. These are some examples of behaviour which may be contrasted with those given in the Food-seeking test notes.

The improvement shown in Clare's score and in Marjory's was probably due to the absence of nervousness—as contrasted with the definite signs of anxiety mentioned in the Food-seeking test notes. If, as suggested in the introduction, the degree of anxiety bears some relation to the strength of the instinct, the higher scores do not, in this case, mean that the incentive was more powerful.

Self-competition. The average for this test shows a further decrease. This again is accompanied by behaviour which appears to be significant. There are very few examples of behaviour showing interest and effort: Jean at the beginning of her second trial said, "See if I can get it up!"; and Evelyn ran her finger up her chart, then on as high as she could reach, saying, "I'll get it up as big as...." Marjory worked carefully and slowly, pursed her lips, looked constantly at her chart and began her last pile nearer to the pile of bricks. On the other hand there were a number of instances of indifference. Freda very rarely adjusted her piles—although each one was either twisted or irregular. Jean also ignored twists, did a fair amount of gazing round, and played with her dominoes before placing them. Ruby seemed to consider that some further incentive was necessary, for after I had explained to her about filling in any advance on the chart she asked, "and what then?" and remarked during her second trial, "I might get something" and "what will you show me?"—which suggests that the previous incentives were still active.

Margaret's improved score must be mentioned. For the first time she went through a test without speaking! During the Curiosity test she had kept up a constant chatter. "It's a doll"; "Is it dominoes?"; "Is it a nice thing?"; "Do you know what it is?" etc., etc., but in spite of this apparent interest and the fact that she was not disturbed as in the previous test, her average was lower than for that one. Margaret is a moody child. The former tests were carried out on two of her excitable days. The excitement was not in the first place aroused by the incentive, although it was probably increased by it. This last test was given when she was in a quiet, busy mood, hence the change in her achievement and behaviour.

Competition. It will be seen that the lowest average score was made during the Competition tests. The behaviour of the children this time can hardly be compared with that of any other test. A companion to work with made the conditions different, and the result was very much more conversation and relatively little serious effort. The tendency to be diverted from the main purpose because of the presence of a fellow-worker was shown by Freda saying to Clare as they began working: "Clare, how old are you?"; and later Clare remarked: "Someone's coming to have tea with me." That the incentive was not working as intended was shown by Margaret saying to Hugh after their first trial: "I'll try to get all mine up and you try to get all yours up." Marjory also when her last pile had fallen over went over to help Evelyn "to get all hers on," handing the dominoes to her and asking to be allowed to put some on. When, in spite of Marjory's assistance (or because of it) Evelyn's pile fell at 12, and they were told that Marjory's pile was the higher, Evelyn announced in a satisfied and admiring voice: "Coo, she's beated the game!"

Having in mind some theories bearing on infant sexuality, an attempt was made while Jean and Hugh were being tested to reinforce the competitive instinct by an appeal to sex. They were asked whether little girls or little boys should get the bigger pile. This led to the following conversation—which an earnest Freudian might have found somewhat disconcerting: Hugh to Jean, "You'd be a little boy if your hair was like mine"; Jean to Hugh, "If you'd my jumper on you'd be a little girl"—and to a drop of 4 in Jean's score, while Hugh just maintained his previous low score of 20 as against 30, 27 and 30 in other trials.

With two groups there developed a little game of pretending to shake the table so that both piles might fall, and Jean seemed to think that the best part of the business was seeing how soon a pile came down. As a rule, both children laughed heartily whenever one collapsed! Here we have another motive taking the place of the one the incentive was calculated to arouse: the play impulse was awakened, and the companion, instead of being a competitor became a playmate. With Freda, also a new motive appeared. Before her second trial she said: "I'm going to get mine nice." This remark suggests that some impulse associated with the self-regarding sentiment had appeared. These two examples are the only definite instances in the whole of the experiment of the original incentive being replaced by another.

In the conversation there was plenty of reiteration of idea based on the opening injunction: "See who can get the biggest pile!" such as "Wish I could get the biggest!"; "I've got the biggest," etc., etc., but most of it seemed like playing with words—for the remarks were thrown backwards and forwards—and good-humoured chatter.

III. SECOND GROUP.

Some months later the experiment was repeated with a different group from the same school whose ages corresponded as nearly as possible with those of the former children:

	Age	
	Years	Months
Dorothy	6	1
Marjorie	6	1
Dennis	6	1
Peter	5	1
Betty	5	0
Lewis	5	0
Eric	4	6
Olive	4	5
Hilary	4	5

One or two slight alterations in method were made: the children were told to place the dominoes, numbers downward, on the pile, one by one; and before the Food-seeking test they chose their own incentive from a bowl of apples, bananas and chocolate biscuits.

The Intelligence tests and the Self-competition test had to be omitted: there was not time for them.

Results.

Table I A. *Last practice test.*

	Trials					Average score
	1st	2nd	3rd	4th	5th	
Dorothy	15	35	22	33	22	25·4
Marjorie	24	16	32	23	20	23
Dennis	20	22	24	21	29	23·2
Peter	20	30	17	16	20	20·6
Betty	8	16	7	16	19	13·2
Lewis	7	21	15	12	19	14·8
Eric	19	21	22	13	32	21·4
Olive	23	23	20	20	24	22
Hilary	8	7	8	16	12	10·2
					Average	19·3

Table II A. *Food.*

	Trials					Average score
	1st	2nd	3rd	4th	5th	
Dorothy	22	37	34	41	38	34·4
Marjorie	25	23	22	22	23	23
Dennis	—	—	—	—	—	—
Peter	33	27	27	32	22	29·8
Betty	31	14	17	14	22	19·6
Lewis	17	30	28	22	25	26·2
Eric	19	17	14	33	12	19
Olive	28	34	29	36	38	33
Hilary	15	18	16	19	11	15·8
					Average	25·1

Table III A. *Competition.*

	Trials					Average score
	1st	2nd	3rd	4th	5th	
Dorothy	33	33	28	19	27	28
Marjorie	33	41	24	21	18	27·4
Dennis	21	26	16	36	14	22·6
Peter	26	25	36	14	26	25·4
Betty	16	22	24	26	27	23
Lewis	34	18	19	20	21	22·4
Eric	29	20	21	32	35	27·4
Olive	21	15	19	27	23	21
Hilary	11	20	14	4	6	11
					Average	23·1

Table IV A. *Curiosity.*

	Trials					Average score
	1st	2nd	3rd	4th	5th	
Dorothy	30	28	26	15	25	24·8
Marjorie	23	39	25	29	29	29
Dennis	29	23	31	35	27	29
Peter	18	20	27	14	8	19·8
Betty	26	25	12	16	27	21·2
Lewis	26	34	19	23	20	24·4
Eric (absent)	—	—	—	—	—	—
Olive	22	29	30	24	30	27
Hilary	18	15	15	9	12	13·8
					Average	23·6

Table V A. *Showing the average for each child in each test.*

	Practice	Food-seeking	Competition	Curiosity
Dorothy	25·4	34·4	28	24·8
Marjorie	23	23	27·4	29
Dennis	23·2	—	22·6	29
Peter	20·6	29·8	25·4	19·8
Betty	13·2	19·6	23	21·2
Lewis	14·8	26·2	22·4	24·4
Eric	21·4	19	27·4	—
Olive	22	33	21	27
Hilary	10·2	15·8	11	13·8

Table VI A. *Giving the average score for each incentive and the highest average during the test.*

	Average score	Highest average
Practice test	19·3	25·4
Food-seeking	25·1	34·4
Competition	23·1	28
Curiosity	23·6	29

So that a further comparison might be made, all scores for the incentive tests which were above the child's average last-practice score were weighted. To the consecutively increasing numbers in the pile were added 0·1, 0·2, 0·3, etc. (one to each) + the previous weight: *e.g.* if 25 = average last-practice score, 0·1 was added to 26; 0·2 + 0·1 to 27; 0·3 + 0·3 to 28, etc.

Table VII A. *Showing the weighted average for each child in each test.*

	Food-seeking	Competition	Curiosity
Dorothy	41·4	29·6	25·2
Marjorie	23·1	31·5	32·6
Dennis	—	24·5	31·9
Peter	35·4	29·3	20·5
Betty	24	29·3	26·8
Lewis	34·8	27·9	31·6
Eric	20·6	31·5	—
Olive	40·4	21·3	29·1
Hilary	18·2	12·3	15·2

Table VIII A. *Showing the weighted average score for each incentive and the highest weighted average during test.*

	Weighted average score	Highest weighted average
Food-seeking	29·7	41·4
Competition	26·3	31·5
Curiosity	26·6	32·6

If the numerical results of the two parts of the experiment are compared it will be seen that the general level of skill, as represented by the height of the piles, was, on the whole, higher the second time than the first. The instructions given at the beginning of the second series of tests may account for this, yet it seems probable that some children in the second group possessed greater constructive ability than any in the first.

A comparison of Tables VII, VI A and VIII A shows some degree of correspondence between them: the order of the incentives, as based on the numerical results, remains the same.

A number of examples were given in the first part of this paper to show the relation between behaviour and score: similar ones could be taken from the more recent tests if it were necessary.

Eric's work, however, may be noticed. During the Food-seeking test he had no score between 19 and 33; during Competition nothing between 21 and 29. The reason for this could be clearly traced in his behaviour. Each pile was persistently patted between his palms in its early stages. If, in spite of this treatment, it managed to maintain its equilibrium until it reached the height of about 20 or 22 (and only the fourth pile in the Food-seeking test accomplished this) Eric's zeal for adjusting suddenly expired, and he tried—very successfully, as his higher scores show—to keep the balance by careful placing only. If his results are omitted the weighted average scores in Table VIII A would be:

Food-seeking	31·4
Competition	25·7
Curiosity	26·6

IV. Comments and conclusions.

1. The examples of behaviour seem to confirm such inferences as may reasonably be based on the numerical results, for in each test a change in the level of performance was accompanied by a corresponding change in the amount of interest or effort shown by the children.

2. Although the Food-seeking test shows a very slight advantage over the others in its average score, the significance of it is emphasized by the following points:

(*a*) It was the only test in which nervousness and outside distractions evidently lowered the score.

(*b*) Examples of behaviour expressing interest and effort were more numerous than in any of the other tests.

(*c*) There were no instances of behaviour showing lack of interest.

3. It must be remembered that before each trial in the Curiosity test an attempt was made to reinforce the strength of the stimulus. This must be regarded as an advantage when this test is compared with the others. Also after each trial in the Competition test one of the two children had the extra stimulus of a temporary success, whereas in the Food-seeking and Curiosity tests each trial ended in the disappointment and probable discouragement of failure.

4. In considering the results of Competition, the low score and lack of behaviour expressing effort is accounted for by the fact that the stimulus, *i.e.* the other child, was regarded as a companion, not as an opponent. This suggests either that the competitive instinct is weak in young children, or that the methods of this particular school (which encourage the children to take an interest in each other's work) do not develop it.

5. Alterations in the height of the piles were not due to changed method for, in the first part of the experiment, each child had developed her own and continued to use it, while in the second part a uniform method was enforced.

6. Individual variety of method employed in building has been mentioned. One child put on the dominoes singly, adjusting each one

if necessary; another arranged three or four carefully in her hand and then placed them, while a third put an irregular handful on the pile and adjusted them there; Hugh made a small pile on the table, regulated it and then transferred it to his main one; and so on.

7. Another feature of the experiment which is more difficult to illustrate was the variety in the general type of behaviour of one child as compared with another. This variety was, probably, largely the result of differences in temperament. When this variety, and the pronounced differences in the method of working, together with differences in age and intelligence are realized, it seems all the more significant that any group reaction can be noted in the course of the experiment. This latter suggests that the incentive aroused some conative impulse common to the group of children, and that the ensuing behaviour gives some indication of its strength.

8. Reference has been made to temperament. The children were too young to be given the June Downey will-temperament tests, which is unfortunate, for it seems probable that temperament played a more important part in causing variations from the average standard than did either age or intelligence. Experiments might profitably be carried out to show the effect of incentives upon varying temperaments, and the relation of temperament to instinct.

9. Finally, although the experiment was only carried out on a very small scale, there seems to be some ground for suggesting that further work may be done on the relation of achievement and behaviour to the strength of instincts.

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THE BIOLOGICAL SIGNIFICANCE OF BLUSHING AND SHAME.

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During the past century there has appeared intermittently a series of publications on the topics of this brief contribution. They were brought to a focus by Darwin in his *Expressions of Emotions in Man and Animals*, and again by Havelock Ellis in his monumental *Studies in the Psychology of Sex*. That these—and other—authors failed to achieve a satisfactory and unitary theory was due, I believe, primarily to their ignorance of the modern doctrine of the antagonism of the sympathetic and vagal divisions of the involuntary nervous system, and secondarily to their neglect of concealment and immobility behaviour as a reaction to danger. This neglect is no longer possible, since Rivers has advertised the fact that fear-flight and anger-aggression are by no means the only primitive reactions to danger. Cannon[1], with delicate technique, has shown how the emotions of fear and rage are accompanied by over-activity of the sympathetic-adrenal system, and his work has been cited with dreary iteration by all those who uphold the James-Lange theory of emotions, without their realizing that—so far as Cannon's findings go—it would seem to indicate that the physiological basis is the same for all emotions. It is my intention to indicate how in blushing and shame we may have an emotion with a different physiology and one that is part of a much neglected, though important, biological reaction to danger.

According to the view of Darwin, which impregnates modern psychology, the expressions of emotion are instinctive reactions that were adaptive in a pre-human or early savage period, even if they are no longer useful; or they are parts of general adaptive physiological disturbances that have survived because they have attained some social significance. In this sense he discusses not only involuntary gestures and grimaces, but also changes in circulation, secretion and so forth. The latter, being normally under no mental control, have the deepest biological significance, and Cannon has argued that sympathetic-adrenal stimulation betokens a response to undue physical exertion, originally consequent thereto but now, as an emotional reaction, prospective and preparatory. There seems to be no reason why this interpretation should be rejected and, if we accept it, the converse should also hold, namely, that if an instinctive response is towards immobility, its involuntary accompaniments ought to represent the opposite swing of the vagal-sympathetic pendulum, that is, a paralysis of the sympathetic and a stimulation of the vagal system.

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[1] *Bodily changes in Pain, Hunger, Fear and Rage*, New York, 1915.

The careless observer is apt to think that blushing is a reaction confined to the face, ears and neck. All who have studied the phenomena agree, however, that subjectively, at least, the disturbance has a wider distribution than is objectively manifest. The most frequent report is of the skin of the trunk and sometimes of the whole body, feeling hot or even tingling and pricking. As long ago as 1839 Burgess[1] opined that there was a tendency for all the skin to redden, but that it did so usually only on those surfaces which are habitually exposed and where the minute blood vessels have become more labile than in protected regions. This view is now confirmed by Lewis in the course of his prolonged and critical study[2] of vascular skin reactions, in which he observed that exposure produces atonia and consequent liability to dilatation in superficial blood vessels. The boundary of a woman's blush is normally the same as that reddened or tanned in the sun and varies with the fashions of the age. Amyl nitrite produces a flush in the same area, and Lewis thinks that emotional blushing may be due to the appearance of a substance which affects the peripheral vessels in an analogous manner. Its appearance is too rapid, however, to be the result of a chemical distributed through the blood stream and, if it be produced *in situ*, it must be in consequence of a specific nervous stimulus. It is tempting to assume that the nervous influence is an upsetting of the normal balance between the vagal and sympathetic nerve supplies. (Stimulation of the sympathetic produces pallor, and section of a sympathetic nerve gives flushing.)

This assumption receives some support from the work of G. E. Partridge[3], who examined the answers of some 120 subjects to a questionnaire about blushing, promulgated by Stanley Hall. Unfortunately his observers were not expert at discriminating between neurotic and normal manifestations, and there are no objective phenomena reported. Moreover Partridge jumbles all the findings together, so that rather contradictory reactions appear in the same summary. One does not know how many of the events described occurred in one case. The total list includes queer sensations from all parts of the body, and some of these suggest sympathetic rather than vagal stimulation. But, unless the order of symptoms is known and the sympathetic response is seen to be primary, there is nothing in this to upset the view that blushing is an external manifestation of a widespread vagal display. In the re-establishment of balance the body often goes from one extreme to the other. We know that a strengthening of the vagal over the sympathetic component leads to a fall of blood pressure and a slowing of the heart: it is like a shock. Partridge says: "Some...effects are undoubtedly due to the momentary cessation of the heart beat, there is a temporary lowering of general pressure and anaemia of peripheral blood vessels, then a sudden renewal of heart action and increased pressure." One of his conclusions is that, "The shock element plays an important part in the causes of blushing....There is a 'caught in the act' feeling about it."

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[1] *The Physiology or Mechanism of Blushing*, 1839, pp. 114, 122.

[2] *The Blood Vessels of the Human Skin and Their Responses*, London, 1927, p. 157.

[3] "Blushing" Pedagogical Seminary, April 1927.

A crucial phenomenon would be a contraction of the pupils coincident with blushing, as it would show that the involuntary nervous system balance was upset in a vagal direction. Unfortunately this is a difficult observation to make: the illumination of the eyes must be constant as well as the distance adaptation of the iris muscles, the circumstances under which blushing occurs are those in which it is impolite to gaze into the eyes of the subject and, finally, with blushing the subject almost always looks down or avoids a glance. A neurologist friend of mine who thinks the pupils do contract has been trying for months to make a definite observation but has so far failed to see anything one way or another.

It has been suggested above that, if sympathetic action has the biological significance of muscular exertion, a vagal preponderance should indicate the reverse tendency—that of immobility. Since most, if not all, animals have an enormously high visual threshold for motionless objects for which they are not searching, the immobility reaction affords a security that is difficult for us humans to realize. But it depends on its completeness: a tremor, a movement of the eyeballs will betray it. Hence the threshold for responses to the environment must be raised as it is in human sleep or stupor. In these states the involuntary nervous system changes are indicative of reduced sympathetic activity, so it is not straining probability to assume that during immobility there is a similar fall in blood pressure and general inertness due to sympathetic paresis.

The behaviour displayed in the assumption and maintenance of immobility is so simple as almost to be called reflex. Its object is concealment, which man achieves through highly complicated instinctive, or consciously planned behaviour. He hides himself and does not trust to nature's cloak of invisibility; it is safer to be behind an opaque rock than to trust to an enemy's failure to see the man in front of the rock as only a part of the latter. The complicated reaction having given greater security the more primitive one lapses and reappears only as an abnormal response or in fragments in the structure of an emotion. James said that we are afraid because we run. A more accurate statement of his theory would be: we are afraid because part of us wants to run; that part (the sympathetic system) is running wild and gives the feeling of fear or, at least, contributes to it. The inner man of the prisoner, who pleads his case pale, sweating and with pounding heart, is in flight while the outer man is still. Part of him is indulging in a response appropriate only to more primitive behaviour. We should similarly expect a sudden desire for concealment to be accompanied by some evidence of the immobility reaction. Blushing and the feelings going with fall of blood pressure are an indication of this.

The association of shame with a tendency towards concealment has been stressed by many authors from Darwin onwards, while its relationship to danger was noted even by the ancients. The mistake has usually been made of associating shame with fear on the naïve view that flight is the only response to danger. Darwin, being a biologist, was not guilty of that error, and, being a psychologist as well, he knew that different emotions must have different origins. The unhappy wretch who blushes, averts his eyes, hangs his head, covers his face with his hands and "wishes he might sink through the floor," is hardly the picture of fear. Moreover the mental confusion so common in embarrassment is more characteristic of the inertness of immobility than of the liveliness of flight. In fact the common phrase 'covered with confusion' contains both the elements of concealment and incapacity to respond. Among etymologists the favourite theory for the origin of the word 'shame' is that it comes from a preteutonic root cognate with a word meaning to cover.

Those who have claimed that embarrassment is associated with danger have arrived at their conclusion from a study of all the component phenomena which they interpret as impulsive efforts to avoid the observation of hostile onlookers. Yet it is notorious that in our society the situations which excite shame do not involve any physical threat. This is a far cry from a primitive immobility reaction and it challenges explanation. The common occasions for our embarrassment are exposure of the parts of the body usually hidden, the betrayal of sexual thoughts, lapses of etiquette and unusual conspicuousness of the subject. What kind of evolution could give these predicaments a meaning of danger? The answer is to be found in a study of shame as it occurs among savages and in a consideration of the development of modesty.

A most important point to bear in mind is that immobility or concealment is not a reaction to an already existent danger, but aims at preventing the danger from arising. If I am perfectly concealed I need fear no foe, no matter how near he may be. Concealment is therefore sought prior to the performance of any act which would preclude rapid self-defence. In general the indulgence of any appetite tends to raise the threshold for stimuli irrelevant to the satisfaction of the appetite involved. The more powerful the appetite the greater the potential danger, and hence the greater the need for isolation. The sexual and nutritional lusts claim first place. Many animals will not eat while under observation, and it is difficult to witness coitus between the male and female of almost any wild species. Savages, who are immodest in many ways according to our prejudices, never perform the sexual act where they can be seen, except, rarely, as a religious rite. Prof. Malinowski writes me: "Eating very definitely tends to be secretive I find from the scanty notices of commensalism among primitive peoples, that eating in company is extremely rare, that eating among strangers is regarded as definitely indecent." Incapacity to deal with potential dangers is still more obvious during illness and sleep. Consequently both animals and men evince a desire for isolation when ill or sleepy that extends from a pure mandatory instinct to a mere tendency. Malinowski[1] generalizes thus: "It is characteristic that sexual activities, sleep and excretion are surrounded by protective taboos and mechanisms of concealment and isolation in every society."

A factor of no mean importance is probably the assumption of a posture in which speedy defence is impossible. This is pre-eminently true of copulation and excretion in a squatting position. So strong is the tendency to seek seclusion for these acts that it persists even in our own civilization, giving rise to curious anomalies in behaviour. My attention has been drawn to one of these by my friend, Dr T. A. Ross, who pointed out that men who urinate shamelessly in public will not only retire for defaecation but will lock the door even when the possibility of interruption is remote. On the other hand, women who assume the same position for both forms of excretion are equally secretive about them, and are loath to exhibit either micturition or defaecation even to their own sex. This is particularly striking in Southern European countries where men urinate shamelessly in public places but never defaecate, whereas women, who will expose their breasts when nursing babies in a most matter-of-fact way, will never indulge publicly in either kind of excretory act. The factor of position is summarized in the American phrase, "To be caught with the pants down," which expresses defencelessness and not shame as it should do in the context of modern social usage.

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[1] Personal communication.

A third factor importing danger into the indulgence of appetites has been suggested to me by Prof. Malinowski. It excites jealousy. Hence to make love or to eat in public is to invite rivals to seize that which is being enjoyed. Our table customs, he thinks, may have as their *raison d'être* the suppression of too expressive delight.

It has frequently been remarked that what constitutes a virtue or a sin varies enormously from one human society to another. This is equally true of shame. To us the naked savage seems immodest, to him one of our restaurants would be horrifying. All the variations can probably be explained by invoking four factors. These are growth of security, the conservatism of customs, the evolution of modesty and the extension of shame through unconscious symbolism. These factors may be briefly treated in the order named.

Primitive man, moving in a universally hostile environment, sought seclusion, we may assume, for all acts which tended to reduce his capacity to defend himself. This is a purely instinctive affair and not necessarily associated with any feeling of shame. In an early society some activities exposed him to danger from his fellows. These had to be indulged secretively. When a stimulus for such an activity produced an impulse towards seclusion at the same time that gregariousness urged him to remain with his mates, we must imagine that a conflict arose and the emotion of shame was born. It became an indication, a betrayal, of an impulse towards action that was biologically solitary and therefore individualistic. Shame has, as one of its components, the feeling of being singled out from the mass. As civilization has advanced personal safety has become more and more secure, and the necessity for isolation in the indulgence of appetites has diminished. There are, therefore, only relics in our society of shame over such practices as eating, sleeping or invalidism. Were potential danger the only factor we ought to have no shame about excretion or licensed sexual intercourse in public and be embarrassed only over definitely anti-social undertakings.

As a matter of fact, of course, the primitive still lives on in us entirely apart from social usage. As I have said, a man shuts himself up to defaecate. Almost everyone is ashamed of falling asleep inadvertently and usually protests that he has been awake all the time, and those of the upper classes object to sleeping at all in anything but a private room. An interesting development is the transference of what was once an individual isolation into the isolation of friends or social groups. Officers and men have separate messes and latrines, one is ashamed to eat with servants, a southerner may prefer to go hungry rather than to eat in the same room with a negro. Among boys, particularly those with rural experience, excretion in the presence of their mates is a sign of comradeship and this reappears in martial life[1]. If we cannot sleep in privacy we prefer our friends or those of our own class as our neighbours. In general it might be said that, emotionally, we have achieved a feeling of security only within our cliques and not with mankind in general.

The second factor, that of convention, accounts for the survival of many occasions for embarrassment. Once any practice is surrounded by taboos and ceremonials these give a social significance that is part of the identity of the group. To modify them is to tamper with the life of the society in question, which the society naturally resents. If one inadvertently does "what isn't done," the feeling of exclusion from the group—the feeling of shame—is coincident with recognition of the mistake. The conservatism of custom unquestionably accounts for the maintenance of a feeling of delicacy about certain topics of conversation, and table manners, for instance. This is well shown in connection with demonstrativeness. As we have seen, indulgence of appetites under primitive conditions is potentially dangerous and they become secretive. The next step is a cloaking of the feelings which these appetities arouse: this becomes conventionalized and then demonstrativeness in general is taboo. The upper classes in all civilized countries are more self-contained than the lower, but the variation from one land to another is enormous. The Englishman says the Frenchman gesticulates like a madman; the Frenchman avers the Englishman is totally without feeling. Either would be ashamed to behave like the other.

Modesty is so important a factor in the evolution of shame that it would be impossible to deal with it at all in such a brief communication as this, were it not that it is safe to assume that you are all familiar with its biological significance as elaborated by Darwin, and its human evolution as delineated by Havelock Ellis. It is present in many animals well below the human level, and is installed as an element in courtship.

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[1] See *All Quiet on the Western Front.*

Biologically, modesty, or shyness in the female, is a temporary reluctance to yield to sexual overtures which serves to lure the ardent male in pursuit and discourage his less energetic rival. In complex human psychology it affects the male as well and, not unnaturally, is soon intertwined with sexual shame. A private, as well as a public taboo, so to speak, is thus laid on sex. This alone would tend to make sex the most important cause for embarrassment in our civilization and, of course, there are other reasons for the elevation of it into a position of supreme notoriety. It would be impossible even to outline them in such a brief communication as this, but I imagine there would be few to deny the claim that shame now tends to centre in and irradiate from sex. It is difficult, for instance, to understand why excretory processes should have retained their claim to concealment during all the ages that separate the savage and the savant, were it not that they necessitate an exposure of the sexual organs.

This brings us to our fourth factor in the variability of shame. Why do some people blush and act as if ashamed when praised in public? This can be taken as an example of individual variation. I have already pointed out that one element of shame is the feeling of being conspicuous. Praise makes one conspicuous. But why should conspicuousness make some people unhappy, when it stimulates others pleasantly? The answer to this question is best given, I believe, in psychoanalytic terms. Modesty and convention demand that the sexual organs—the *pudenda*—should be hidden. On the other hand, display of secondary sexual characters, if not of the organs themselves, is part of the total mating behaviour. Biologically, therefore, we inherit opposed tendencies and, in all of us, there are deep-rooted impulses towards sexual display. In the absolutely normal civilized man or woman exhibitionism gains a slight outlet of a direct kind in connection with licensed sexual activities, but is chiefly satisfied symbolically. In the broadest sense (and therefore, perhaps, most accurately) the peacock who raises and spreads his tail is acting symbolically and the millinery of the human female has a similar function[1]. Even at the animal level there is a transference in the nature of the display from the sexual organs themselves to other parts of the body, to the body as a whole, and to the performances of that body. At the human level the same translation takes place but can go further so as to include the person, the personality, or some special attribute of it. Public recognition of worth can symbolize successful exhibitionism and it does so in the normal individual. But if this symbolism is inadequate as an outlet, there remains, unconsciously, an unsatisfied lust for sexual display, and this can be held in check only by modesty so disproportionate as to be pathological. Any kind of conspicuousness can then affront this modesty and throw the unfortunate into a paralysis of embarrassment[1]. One bit of evidence in favour of this argument is the practically universal habit among men unaccustomed to public speaking of seeking some cover for the pelvic regions. They must stand behind a table, a desk or the back of a chair which will hide the middle of the body. Failure or success in achieving such protection may make all the difference between failure or success in conquering embarrassment. Almost any man can multiply instances of behaviour of this order.

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[1] Complexion in all the white-skinned races is such an important element in beauty that we may perhaps regard the maiden's blush and rosy cheeks, which depend on atonia in the minute vessels in the skin, as secondary sexual characteristics. If so, this localized atonia would have a survival value that would account for the skin of the face not gaining the adaptation to exposure which there is in the skin of the hands.

It may be well in conclusion to recapitulate the argument of this paper. A number of authors have concluded that the behaviour accompanying the emotion of shame represents an instinctive seeking of cover. Blushing is, perhaps, an evidence of the shifting of balance in the involuntary nervous system towards a strengthening of the vagal component at the expense of the sympathetic. This suggests a reaction by the organism towards inactivity and, among the danger responses, this would mean immobility rather than flight or aggression. Immobility among animals turns to hiding in man, and the physiology of blushing and the behaviour of shame are thus identified at primitive levels. Among savages concealment is sought for practices that are potentially dangerous in a hostile environment. These are eating, sleeping, sexual intercourse and excretion. Shame develops in connection with publicity in the indulgence of these four. In modern civilization security has been achieved for the first two and only traces of shame persist in connection with them. Modesty, of biological origin, has over-determined the shame concerning sex and this has been extended to excretion. Finally, symbolism has made possible the appearance of shame in connection with practices that are neither sexual nor potentially dangerous.

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[1] It should be borne in mind that this is a suggested explanation only for anomalous liability to shame. In every society convention decrees a certain limit which is set to public praise: whenever this standard is exceeded, the recipient of the praise is made conspicuous and therefore feels shame.

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ARCHETYPAL PATTERNS IN TRAGIC POETRY.

By MAUD BODKIN.

I. *Nature of the enquiry and reasons for undertaking it* (pp. 183–186).
II. *Reasons why archetypal patterns should be studied in the experience communicated through poetry* (pp. 187–189).
III. *Value for this purpose of particular passages possessing power of 'incantation'* (pp. 189–191).
IV. *Examination of the Oedipus complex as a pattern determining our imaginative experience of* Hamlet (pp. 191–193).
V. *Further illustration of the theme of conflict between the generations, involving 'splitting' of a type figure, the object of an ambivalent attitude* (pp. 193–195).
VI. *Examination of the form of tragic drama, in relation to Jung's discussion of fantasy figures from the Collective Unconscious* (pp. 195–200).
VII. *Conclusion* (pp. 200–202).

I. NATURE OF THE ENQUIRY AND REASONS FOR UNDERTAKING IT.

IN an article upon "The relation of analytical psychology to poetic art[1]" Dr C. G. Jung has set forth a hypothesis in regard to the psychological significance of poetry. The special emotional significance possessed by certain poems—a significance going beyond any definite meaning conveyed—he attributes to the stirring in the reader's mind, within or beneath his conscious response, of unconscious forces which he terms 'primordial images,' or archetypes. These archetypes he describes as "psychic residua of numberless experiences of the same type," experiences which have happened not to the individual but to his ancestors, and of which the results are inherited in the structure of the brain, *a priori* determinants of individual experience.

It is the aim of the present paper to examine this hypothesis, testing it in regard to examples where we can bring together the recorded experience and reflection of minds approaching the matter from different standpoints. It is hoped that, in this way, something may be done toward enriching the formulated theory of the systematic psychologist through the insight of more intuitive thinkers, while at the same time the intuitive thinker's results may receive somewhat more exact definition.

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[1] *Brit. J. of Med. Psychol.* III (3).

My main illustration I shall take from an essay by Prof. Gilbert Murray[1], where the effect of great poetic drama is described in language somewhat similar to that of Jung. Gilbert Murray has been comparing the tragedies of *Hamlet* and of *Orestes*, noting the curious similarities between them, and how the theme that underlies them seems to have shown an "almost eternal durability." When such themes as stirred the interest of primitive man move us now, he says, "they will tend to do so in ways which we recognize as particularly profound and poetical" (p. 238). Gilbert Murray apologizes for the metaphor of which he cannot keep clear when he says that such stories and situations are "deeply implanted in the memory of the race, stamped as it were upon our physical organism." We say that such themes "are strange to us. Yet there is that within us which leaps at the sight of them, a cry of the blood which tells us we have known them always" (p. 239). And again: "In plays like *Hamlet* or the *Agamemnon* or the *Electra* we have certainly fine and flexible character-study, a varied and well-wrought story, a full command of the technical instruments of the poet and the dramatist; but we have also, I suspect, a strange, unanalysed vibration below the surface, an undercurrent of desires and fears and passions, long slumbering yet eternally familiar, which have for thousands of years lain near the root of our most intimate emotions and been wrought into the fabric of our most magical dreams. How far into past ages this stream may reach back, I dare not even surmise; but it seems as if the power of stirring it or moving with it were one of the last secrets of genius" (pp. 239–240).

We have here an expression, itself somewhat imaginative and poetical, of an experience in presence of poetry which we may submit to closer examination—and this in two ways. We may study the themes that show this persistence within the life of a community or race, and may compare the different forms which they assume; also we may study analytically in different individuals the inner experience of responding to such themes.

The enquiry is plainly of a subtlety and complexity apt to discourage at the outset those who prefer to avoid all questions that cannot be investigated in accordance with a strict technique. There is little possibility here for experiment, since the kind of emotional experience which it is desired to investigate cannot be commanded at will under test conditions. A profound response to great poetic themes can be secured only by living with such themes, dwelling and brooding upon them, choosing those moments when the mind seems spontaneously to open itself to their influence. We must take where we can find it the recorded experience of those who have such acquaintance with poetry.

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[1] "*Hamlet* and *Orestes*," included in *The Classical Tradition in Poetry*, Oxford, 1927.

To the present writer it appears, however, that it is by the study of such deeper experience that psychology at the present time particularly needs enrichment. We might almost say that academic psychologists have been routed by the attack of those medical writers who claim access to the deeper layers of the mind, just because the demand for exact verifiable results has held academic psychologists to the mere outworks or surface of the mind they set out to study. If inexactness of thought or one-sided emphasis has characterized the medical writers, this can be established only by following them along the obscure paths they have opened into the concrete human psyche, and bringing to bear, if possible, a wider ranging interest and a more exact and cautious scrutiny.

The student who seeks to explore the imaginative response of present-day minds to the great themes of poetry may profit by considering the work not only of the medical psychologists, but also of the anthropologists who have attempted to study scientifically the reactions of more primitive minds. In studying the reception by a people of new cultural elements anthropologists have made use of the term 'culture pattern' to designate the pre-existing 'configuration,' or order of arrangement, of tendencies which determines the response of members of the group to the new element. In discussing the value for our 'conceptual explorations' of 'the culture pattern concept,' Goldenweiser[1] has noted its relation to the concept of form and system in the arts and cultural disciplines; and L. L. Bernard, in the same work, has undertaken a classification of different kinds of environment, distinguishing the psycho-social environment, which includes such systems of symbols as are preserved in books, and in which he says "psychic processes reach the highest type of their objectified development." Such stored symbolic content can at any time become effective in activating the corresponding patterns in the minds of members of the group whose collective product and possession the symbols are.

It is within the general field of anthropology or social psychology that I conceive the enquiry to lie which I am here attempting to pursue. I shall use the term 'archetypal pattern' to refer to that within us which, in Gilbert Murray's phrase, leaps in response to the effective presentation in poetry of an ancient theme. The hypothesis to be examined is that in poetry—and here we are to consider in particular tragic poetry—we may identify themes having a particular form or pattern which persists amid variation from age to age, and which corresponds to a pattern or configuration of emotional tendencies in the minds of those who are stirred by the theme.

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[1] *The Social Sciences and their Interrelations*, edited by W. F. Ogburn and A. Goldenweiser, Allen and Unwin, 1928.

In Jung's formulation of the hypothesis, and in the more tentative metaphorical statement of Gilbert Murray, it is asserted that these patterns are "stamped upon the physical organism," "inherited in the structure of the brain"; but of this statement no evidence can be considered here. Jung believes himself to have evidence of the spontaneous production of ancient patterns in the dreams and fantasies of individuals who had no discoverable access to cultural material in which the patterns were embodied. This evidence is, however, hard to evaluate; especially in view of the way in which certain surprising reproductions, in trance states, of old material, have been subsequently traced to forgotten impressions of sense in the lifetime of the individual.

Of more force in the present state of our knowledge is the general argument that where forms are assimilated from the environment upon slight contact only, predisposing factors must be present in mind and brain. Whoever has experienced and reflected upon the attempt to convey an idea, especially an idea of intimate and emotional character, to a mind unprepared to receive it, will have realized that it is not mere contact with an idea's expression that secures its assimilation. Some inner factor must co-operate. When it is lacking, the experienced futility of attempted communication is the most convincing proof that it is, as Mr F. C. Bartlett has said, "not fanciful to hold" that for the capture of objects complete, by the assimilative imagination, there must stir within us "larger systems of feeling, of memory, of ideas, of aspirations[1]." Such systems may be culture patterns confined to a particular group at a certain time, or may characterize a particular individual; but there are others of much wider range. Our question is whether there are some whose "almost eternal durability," in Gilbert Murray's phrase, justifies us in applying to them the term archetypal, and renders them of special interest and importance to the student of psychology and of literature.

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[1] "Types of imagination," *J. of Philosophical Studies*, III (9), 80.

II. REASONS WHY ARCHETYPAL PATTERNS SHOULD BE STUDIED IN THE EXPERIENCE COMMUNICATED THROUGH POETRY.

We come nearer to our particular subject in raising the question: What is the distinctive advantage of having recourse to poetry for the study of these patterns?

Such a theme as that discussed by Gilbert Murray existed as a traditional story in ancient Greece before Aeschylus, and in Northern Europe before Shakespeare handled it. In that form it was already, as A. C. Bradley says of another traditional theme, "an inchoate poem": "such a subject, as it exists in the general imagination, has some aesthetic value before the poet touches it"; "it is already in some degree organized and formed[1]." Enriched by the poet's touch, the traditional story lives on in our imagination, a memory with aesthetic value, but fading into formlessness, when, as perhaps now in the mind of the reader, the reference to Orestes or to Hamlet excites only a faint recollection of what was once a vivid poetic experience. When, therefore, we desire to examine psychologically the emotional pattern corresponding to a poetic theme, we may sometimes avail ourselves of references to the mere tales recalled in outline, but for closer examination there is need that the actual poetic experience be recovered, since it is in the imaginative experience actually communicated by great poetry that we shall find our fullest opportunity of studying the patterns that we seek—and this from the very nature of poetic experience.

In the writings of Prof. Spearman, which have had so much influence in the determining of psychological method, there are references to imagination—one particularly to imagination as exercised in poetry[2]—in which he asserts that imagination in its intellectual aspect does not differ essentially from any other logical process in which new content may also be said to be generated, as when, from a given term, say 'good,' and a knowledge of the nature of verbal opposition, we pass to the term, 'bad.' Such a treatment of imagination illustrates the kind of abstraction that makes psychology, to some thinkers, appear so unreal and empty a study. A student who is interested in imaginative activity as exercised in poetry cannot accept the view that its intellectual aspect can be separated from its emotional nature and covered by any such logical formula as Spearman proposes.

Of the three laws of cognition which Prof. Spearman formulates it would seem to be the first which most nearly concerns the poetic imagination. This law is stated: "Any lived experience tends to evoke immediately a knowing of its characters and experiences." A note adds: "The word 'immediately' means here the absence of any mediating process[1]." It is perhaps within this mediating process, denied by Spearman, that we may find a distinctive place for imagination as exercised in poetry.

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[1] *Oxford Lectures on Poetry*, pp. 11–12, Macmillan, 1909.

[2] *The Nature of Intelligence and the Principles of Cognition*, pp. 334–336, Macmillan, 1927.

When psychologists have raised the question: How does lived experience come to awareness? they have usually been content to assert that it happens through introspection, and to leave to philosophers any further investigation of the question. It is here that difficulty has arisen between the academic and the medical psychologists; since the latter believe themselves to have discovered large ranges of lived experience, of conative character, of which introspection can give no account—a discovery that seems surprising to those who believe that in introspection we have direct access to the nature of our desires.

Prof. S. Alexander[2], examining the question as a philosopher, concludes that lived experience, which is of conative character—as distinct from sensations and images, the objects of the mind—can only be 'enjoyed'; it cannot be contemplated. Introspection, he says, is 'enjoyment' lived through, together with "a whole apparatus of elaborated speech" (I, 18), which causes the elements of the experience enjoyed to stand out in "subtly dissected form" (p. 19). "It is small wonder," he adds, "that we should regard our introspection as turning our minds into objects, seeing how largely the language which expresses our mental state has been elaborated in pursuit of practical interests and in contact with physical objects."

If this view is accepted, we see that the mediating process necessary before lived experience can come to awareness is the linking of such experience with actions and objects that affect the senses and can be contemplated, and with words that recall these objects in all their variety of human perspective. It is in the process of fantasy that the contemplated characters of things are broken from their historical setting and made available to express the needs and impulses of the experiencing mind. The recent study of dreams appears to have made it certain that the bewildering sequence of the images thrown up by the sleeping mind is due to processes of interaction between emotional dispositions lacking the customary control. In individual waking fantasy, and in myth and legend, we have other sequences of images which emotional patterns determine, and which seem to us strange as dreams, when, repeating them in the words used also for the results of logical reflection, we are led to contrast these incompatible renderings of experience.

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[1] *The Nature of Intelligence and the Principles of Cognition*, p. 48.

[2] *Space, Time, and Deity*, Macmillan, 1920.

When a great poet uses the stories that have taken shape in the fantasy of the community, it is not his individual sensibility alone that he objectifies. Responding with unusual sensitiveness to the words and images which already express the emotional experience of the community, the poet arranges these so as to utilize to the full their evocative power. Thus he attains for himself vision and possession of the experience engendered between his own soul and the life around him, and communicates that experience, at once individual and collective, to others, so far as they can respond adequately to the words and images he uses.

We see, then, why, if we wish to contemplate the emotional patterns hidden in our individual lives, we may study them in the mirror of our spontaneous actions, so far as we can recall them, or in dreams and in the flow of waking fantasy; but if we would contemplate the archetypal patterns that we have in common with men of past generations, we do well to study them in the experience communicated by the great poetry that has continued to stir emotional response from age to age. In studying such poetry here, we are not asking what was in the mind of Aeschylus or of Shakespeare when he fashioned the figure of Orestes or of Hamlet, nor do we ask how these figures affected a Greek or an Elizabethan audience. The question is between the writer and the reader of this article: what do the figures of Orestes and Hamlet stand for in the experience communicated to us, as we see, read, or vividly recall the Greek or Shakespearian tragedy?

III. VALUE FOR THIS PURPOSE OF PARTICULAR PASSAGES POSSESSING POWER OF 'INCANTATION.'

A preliminary difficulty, already touched on, must be considered in more detail. How can we secure that the experience communicated by a great play shall be present to us with such completeness and intensity that we can make adequate study of it?

A parallel question has been discussed by Percy Lubbock[1] in regard to the study of the form of a novel. Critical perception, he says, is of no use to us if we cannot retain the image of a book, and the book reaches us as a passage of experience never present in its completeness. The task of the reader, before he can criticize, is to refashion the novel out of the march of experience as it passed. The procession "must be marshalled and concentrated somewhere" (p. 15).

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[1] *The Craft of Fiction*, The Travellers' Library, 1926.

In watching a play adequately interpreted upon the stage, we find, perhaps more readily than in the silent reading of a novel, that the procession of experience is marshalled and concentrated at certain points; so that, recalling the images of these, we can look back upon the whole play as a living unity. The powerful emotional impression thus attained may persist while the play is read and recurred to again and again, and the individual impression clarified by comparison with the reflective results of critics and scholars. Central passages, while the play is thus lived with, grow ever richer in meaning, becoming intertwined with the emotional experience of one's own life.

Some such experience of *Hamlet* I must presume in the reader, since I cannot afford space to recall the play at all fully. I will venture, however, to refer to that passage in which for me the significance of the whole play seems most concentrated.

From the experience of seeing *Hamlet* performed some thirty years ago, there has remained with me the memory of the strange exaltation and wonder of beauty that attended the words of the dying Hamlet to Horatio:

> If thou didst ever hold me in thy heart,
> Absent thee from felicity awhile,
> And in this harsh world draw thy breath in pain,
> To tell my story.

This is one of the passages chosen by Matthew Arnold[1] as 'touchstones' for poetry—passages possessing both in style and substance supreme poetic quality, the Aristotelian high truth and seriousness, beyond that of history or ordinary speech. I would suggest that this 'high truth' of which Matthew Arnold speaks—like that character attributed by Lascelles Abercrombie to great poetry, "a confluence of all kinds of life into a single flame of consciousness"—belongs to the lines not as isolated, but as grown familiar in their setting—the unified experience of the play converging upon them and the incantation of their music carrying them ever deeper into the secret places of the mind that loves them.

One may make some attempt to analyse that 'incantation[2],' or enchantment, in which rhythm and sound of words evidently play a part. It seems to me that the enchantment of the line, "Absent thee from felicity awhile," is heightened by the later echoing of its sounds in the lines spoken by Horatio:

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[1] "The study of poetry," *Essays in Criticism*, 2nd series, 1889.

[2] Cf. Lascelles Abercrombie, *The Idea of Great Poetry*, 1925, p. 19.

> Good night, sweet prince,
> And flights of angels sing thee to thy rest!

Against this music of heaven we feel more poignantly the contrast of the words "in this harsh world draw thy breath in pain" that move, labouring, toward their goal in the words "to tell my story." Through their power of incantation these words, as they fall in their place, seem to gather up all the significance of that struggle of a powerful impulse to action against an obscure barrier, all the impotent anger, and perplexity, and longing for justification and release, that make up the story of Hamlet, as Shakespeare tells it, and make also of Hamlet, and of these lines, a symbol for whatever such struggle and longing has tortured the mind that is responding to Hamlet's words.

IV. EXAMINATION OF THE OEDIPUS COMPLEX AS A PATTERN DETERMINING OUR IMAGINATIVE EXPERIENCE OF *HAMLET*.

Before attempting to compare, with reference to underlying emotional pattern, *Hamlet* and the plays concerned with Orestes, we may consider briefly the study made of *Hamlet* by Dr Ernest Jones[1].

Dr Jones, in exploring the nature of Hamlet's conflict, has to some extent followed the same line of enquiry that I am pursuing here. For what is it that the critic is actually doing when he traces the motives of a character in a play?

In projecting the figure of a man of a certain disposition and analysing the forces behind his behaviour, the critic is inevitably using the emotional experience which he himself undergoes in living through the play. Having experienced, as communicated by the speeches of Hamlet, a certain psychological movement in which a strong impulse to action is aroused, and again and again sinks back into apathy and despair—a movement which, while imaginatively experiencing it, the reader imputes to the fictitious speaker—afterwards, in reviewing the total impression so received, with analysis and synthesis of its successive movements, the critic discerns, so far as his thought does not deceive him, within the

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"A psycho-analytic study of *Hamlet*." Included in *Essays in Applied Psycho-analysis*, 1923.

fictitious personality of Hamlet, the reflected pattern of the emotional forces that have operated within his own imaginative activity.

To Dr Jones the conflict of Hamlet appears an example of the working of the Oedipus complex. Hamlet cannot whole-heartedly will the slaying of his uncle, because "his uncle incorporates the deepest and most buried part of his own personality." The repressed desire for the death of his father and the sexual enjoyment of his mother, persisting unconsciously from infancy, has produced an unwitting identification by Hamlet of himself and his guilty uncle, so that only at the point of death, "when he has made the final sacrifice...is he free...to slay his other self" (p. 57).

This psychological hypothesis, contributed by Freud and elaborated by Dr Jones, has been welcomed by certain literary critics. Herbert Read, referring to the view of J. M. Robertson, that *Hamlet* is "not finally an intelligible drama as it stands"—that Shakespeare could not make a psychologically consistent play out of his barbaric plot and supersubtle hero—urges that however baffling to critics the play may have proved, nevertheless in experiencing it we are aware of a personal intensity of expression, a *consistent* intensity, which gives the play a unity which the older academic critics lacked means to explore[1]. Dr Jones' hypothesis, he considers, does serve to explain this acceptance by our feeling of any difficulties and incoherence which our thought may find. Using the terms I have suggested, we might say that the hypothesis of the Oedipus complex—*i.e.* of a persistent unconscious wish, hostile to the father and dishonouring to the mother, in conflict with the sentiment of filial love and loyalty—offers to our thought an emotional pattern which does correspond to the play of feeling stimulated during a full imaginative participation in the drama. Prof. Bradley has spoken of *Hamlet* as deserving the title of "tragedy of moral idealism[2]," because of the intensity, both of idealizing love and of horror at betrayal of love, that we feel in Hamlet's speeches. He dwells upon the shock to such a moral sensibility as Hamlet's of witnessing the faithlessness of his mother and uncle; yet there seems a discrepancy between the horror and disgust that a sensitive mind might naturally feel at such faithlessness in others and the overwhelming disgust that Hamlet feels, at himself, his whole world and his attempted action, unless we realize that he feels the treachery of his mother and uncle echo within himself, and within the sentiment of loyal love to his father that is his strongest conscious

[1] Herbert Read, *Reason and Romanticism*, p. 101, Faber and Gwyer.

[2] *Shakespearian Tragedy*, p. 113, Macmillan, 1912.

motive. If, in reviewing the experience communicated by the play, we conceive a loyal love undermined, as it were, by a bewildered sense of treachery within as well as without, we must, I think, agree that the Freudian hypothesis does throw some light upon that intimate immediate experience which is the final touchstone of critical theory.

V. FURTHER ILLUSTRATION OF THE THEME OF CONFLICT BETWEEN THE GENERATIONS, INVOLVING 'SPLITTING' OF A TYPE FIGURE, THE OBJECT OF AN AMBIVALENT ATTITUDE.

Perhaps the most important contribution that has been made by the Freudian theory of dream interpretation to the understanding of the emotional symbolism of poetic themes is that concerned with the 'splitting' of type figures. In comparing the Hamlet story with the story of Oedipus, Dr Jones asserts that both are variants of the same motif, but in one the father figure remains single, while in the other it is 'split into two'—the father loved and revered, and the hated tyrannical usurper.

This assertion involves two elements of hypothesis:

(1) The fundamental assumption—implied also in the statements of Jung and Gilbert Murray, with which this discussion opened—that these ancient stories owe their persistence, as traditional material of art, to their power of expressing or symbolizing, and so relieving, typical human emotions.

(2) That the emotion relieved is in this case the two-sided—ambivalent—attitude of the son toward the father. Let us examine this latter hypothesis more closely.

It appears to be characteristic of the relation between father and son that the father should excite in the son both feelings of admiration, love and loyalty, and also impulses of anger, jealousy, and self-assertion. The more the son learns to 'idolize' his father, developing what Shand has called the 'conscience of the sentiment,' so that any muttering of jealousy or hostile criticism is suppressed as disloyal, the more acute will become the tension of the inner attitude. It is such an attitude that can find relief in imaginative activity wherein both the love and the repressed hostility have play. In the story of Oedipus, according to the Freudian hypothesis, a repressed persistent impulse to supplant the father and enjoy the mother finds expression in the first part of the action; then in the latter part, in the hero's remorse and suffering, appears the expression of the sentiment of respect and loyalty. In the

Hamlet legend—as it appears, *e.g.* in the Amleth Saga—combined fear and hostile self-assertion against the father find expression through all the incidents of simulated stupidity, and secret bitter word-play, and at last in the achievement of the plotted slaying of the usurper; while at the same time the sentiment of love and loyalty is triumphantly expressed in that same act of filial vengeance. It is Shakespeare only who appears to have brought into the rendering of the ancient story the subtle factor of the division and paralysis of the will of the hero, by the intuitive apprehension that the impulse that drove his uncle against his father, was one with that present in himself.

The story of Orestes may be considered as another example of the imaginative expression of the ambivalent attitude of child toward parent. In this story, as presented by the three great Attic tragedians, there is a wealth of material, if the limits of our space allowed of its examination, for illustrating the manner in which the mysterious inner forces of emotion may, through the symbolic shapes created by imagination, be made palpable to sense. But we must be content here to consider briefly only the outline of the story.

Considered as a variant of the Hamlet theme, its distinctive note is that the usurper upon whom the son's fierce self-assertion and craving for vengeance strike is not alone the male kinsman, but also the queen-mother, who has betrayed, and with her own hands murdered the father. Therefore the moment of triumphant self-assertion, when the son has proved his manhood, and vindicated his loyalty upon his father's enemies, is also the moment when there awakens, the palpable, pursuing horror of the outraged filial relation—since this enemy was also a parent, the mother of the slayer.

The conflict presented in the Orestes dramas is plainly concerned not with sex, but with combined love and hate of either son or daughter converging upon a parent figure which may be either father or mother. It is the enduring conflict between the generations which continues to find expression in the story, when more temporary questions—such as that between patriarchy and mother-right, which may have been present in Athenian minds—are no longer urgent. That this theme of conflict between the generations had great significance within the sensibility that found expression in Shakespeare's plays, is evident from the tragedy of *King Lear*.

In this drama the emotional conflict between the generations is communicated from the standpoint of the old man, the father who encounters in separate embodiment in his natural successors, the extremes of bestial self-seeking, and of filial devotion. Bradley has noted how the play illustrates "the tendency of imagination to analyse and subtract, to decompose human nature into its constituent factors[1]." This mode of thought, he suggests[2], is responsible for "the incessant references to the lower animals" which occur throughout the play. Thus Goneril is likened to a kite, a serpent, a boar, a dog, a wolf, a tiger. This analysing work of the imagination, separating the bestial and the angelic in human nature and giving them distinct embodiment, in the wicked daughters and Cordelia (and again in Edmund and Edgar, the cruel and the loyal sons of Gloucester), presents another instance of what we have already observed in the 'splitting' of the father figure. The splitting in this play is from the point of view of the parent; as, in the Orestes or Hamlet story, it is from the point of view of the child. As, to the feeling of the child, the parent may be both loved protector and unjustly obstructing tyrant, and these two aspects find their emotional symbolism in separate figures in the play; so, to the feeling of the parent, the child may be both loving support of age and ruthless usurper and rival, and these two aspects find expression in separate figures, such as the tender and the wicked daughters of Lear.

VI. EXAMINATION OF THE FORM OF TRAGIC DRAMA, IN RELATION TO JUNG'S DISCUSSION OF FANTASY FIGURES FROM THE COLLECTIVE UNCONSCIOUS.

We have considered, so far, the emotional pattern corresponding to a particular theme—the conflict between the generations—which, though a recurring one, is by no means co-extensive with the realm of tragic drama. Can we identify an archetypal pattern corresponding to tragedy itself—its universal idea or form?

Gilbert Murray, taking the "essential tragic idea" to be that of "climax followed by decline, or pride by judgment," and attempting a closer analysis of this sequence, maintains that what is 'really characteristic' of the tragic conflict is "an element of mystery derived ultimately from the ancient religious concepts of *katharsis* and atonement[3]." The death or fall of the tragic hero has in some sense the character of a purifying or atoning sacrifice.

In considering this conception we may first remedy an inadequacy that the reader has probably noticed in the previous discussion of the dramas of Hamlet and Lear, Orestes and Oedipus. We have so far ignored the royal status of the father and son concerned in the tragic conflict. Yet the kingly status has great significance for the feeling expressed in the play.

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[1] *Shakespearian Tragedy*, p. 264, Macmillan, 1912.

[2] *Ibid.* p. 266.

[3] *Op. cit.* "Drama," p. 66.

Consider, for instance, the tragedy of *King Lear*. "The master movement of the play," says Granville Barker, is Lear's passing "from personal grievance to the taking upon him, as great natures may, of the imagined burden of the whole world's sorrow[1]." It is Lear's royal status that helps to make this movement possible. King Lear is at once "a poor, infirm, weak and despised old man"—a father broken to tears and madness by his daughters' cruelty, and also in his sufferings a superhuman figure—one who can bid the "all shaking thunder strike flat the thick rotundity of the world" in vengeance for his wrongs. It is in part the associations with which history, and pre-history, has invested the name and image of king that make it possible for us, under the spell of Shakespeare's verse, to accept the figure of Lear as in this way exalted in his agony beyond human stature. His madness, his pitiful humanity, appear, according to that comment which Shakespeare puts into the mouth of an attendant, on behalf of all onlookers, "a sight...past speaking in a king." The word 'king' is here, through its position in the play, loaded with a significance for the sources of which we must go far back in the story of the race and of the individual.

It is probably because, to the mind of the young child, the father appears of unlimited power that in the life-history of the individual imagination the figures of father and king tend to coalesce. Legends and fairy stories that reflect the feelings of more primitive people toward their king are interpreted by the child in the light of his own earlier feeling toward his father. In the case both of the child and of the primitive individual the same process seems to take place—an emerging of the consciousness of self from out a matrix of less differentiated awareness, which may be called collective or group-consciousness. The figures of both father and king tend to retain, within those deeper levels of the mind to which poetry may penetrate, something of the *mana* that invested the first representative of a power akin to, but vastly beyond, that of the individual emerging into self-consciousness.

It is this supernatural aspect which the father-king of tragic drama has for the kindled imagination that is of importance when we try to understand the element of religious mystery which is characteristic of tragedy—plainly in the past, and, as Gilbert Murray holds, in some subtler fashion still in our experience to-day.

[1] H. Granville Barker, *Prefaces to Shakespeare*, 1927, 1st series, p. 171.

Upon this character of tragedy and the tragic hero it is possible, I think, to gain a certain fresh light from a consideration of the conclusions at which Dr Jung has arrived through his study of fantasy figures appearing in personal analysis.

In *The Psychology of the Unconscious*, in the chapter entitled "The Sacrifice," he examines the symbol of the dying hero as it appears in individual fantasy, representing, according to his interpretation, an inflated infantile personality—a childish self that must be sacrificed, if the libido is to move forward into active life—and in a later work he discusses, under the title of the "Mana Personality[1]," a hero figure which he finds appearing with a richer content at late stages of analysis.

It is especially at times when barriers of personal repression are removed and images of 'cosmic' character are arising freely, that the fantasy figure may appear of some great prophet or hero who tends to assume control of the personality[2]. If the conscious or practical personality is poorly developed there is the greater likelihood that it will be overwhelmed when such powerful images rise from the unconscious.

As a literary example of such a case, parallel to actual ones within his experience, Jung accepts H. G. Wells' story of Preemby[3], "a small, irrelevant, fledgling of a personality," to whom is presented in dream and fantasy the figure of Sargon, King of Kings, in such compelling fashion that he is led to identify himself with it. Jung observes that here "the author depicts a really classical type of compensation[4]," and we may compare it with the type of compensation which occurs in connection with what we have already considered as the ambivalent attitude toward a parent.

If, within the conscious life, in relation to a parent, only reactions of admiration and affection are recognized, while other reactions, of hostile character, excited within the brain, are repressed, it is these latter that tend to present in dreams a parent figure as object of violence or contempt. Similarly, if within the conscious life the personal self comes to be known only as "an onlooker, an ineffective speechless man," utterly insignificant; while yet, within the life that animates that particular brain, strong reactions are excited of sympathetic exultation and delight at imaginative representations of human achievement—as the little Preemby of Wells thrilled at "the mystery of Atlantis and of the measurements of the Pyramids"—then there may arise, as compensatory to the belittled self, the figure of a hero-self, or *mana* personality, fashioned, as it were, from the stuff of these imaginative reactions; just as the figure of the hated father was fashioned from the energy of the repressed hostility, in compensation for the over-idealizing love.

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[1] *Two Essays on Analytical Psychology*, 1928, translated by H. G. and C. F. Baynes, Second essay, ch. IV.

[2] An interesting autobiographical account of this condition may be found in the writings of E. Maitland (*The Story of Anna Kingsford and Edward Maitland and of the New Gospel of Interpretation*, 1st edition, 1893). See especially the passage where he describes the first arrival of the authoritative 'presence,' and the voice distinctly heard: "at last I have found a man through whom I can speak."

[3] *Christina Alberta's Father*, 1925.

[4] *Op. cit.* p. 193.

The Preemby of Wells' story is saved from his delusion, after many sufferings, by learning to think of his vision as of the spirit of man and its achievements—an inheritance belonging no more to him personally than to every other man. In the same manner every individual in whose fantasy such mighty ghosts arise, with their superhuman claims and relationships, must learn to distinguish such claims from those of the personal self; while yet the personal self may be enriched through the conscious experience of its relation to the great forces which such figures represent.

In this way, according to the view of Jung—by interpreting and giving conscious direction to the 'pure nature-process[1]' of fantasy in which compensatory images arise—such fantasy can become instrumental to the purging of the individual will and its reconciliation with itself. Is it in some such fashion as this that tragic drama, deeply experienced, now or in the past, exercises the function of purgation or atonement in relation to the passions of the spectator?

We cannot attempt here anything like a complete answer to this question. We may, however, with the question in view, examine a little further the nature of the emotional experience of tragic art, still using the examples of *Hamlet* and of *King Lear*.

Prof. Bradley, in examining the experience of tragedy, cites these dramas as examples of tragedies at whose close we feel pain mingled with something like exultation. There is present, he declares, "a glory in the greatness of the soul," and awareness of an "ultimate power" which is "no mere fate," but spiritual, and to which the hero "was never so near...as in the moment when it required his life[2]."

I quote these statements of Bradley, not of course as universally acceptable, but as the attempt of one eminent critic to render his own deeply pondered experience of tragic drama. The experience is rendered in terms rather of philosophy or religion than of psychology. Can we translate it into any more psychological terms? What is this spiritual power, akin to the characters, and, in some sense, a whole of which they are "parts, expressions, products[1]"? I would propose (following the view set forth by F. M. Cornford) the psychological hypothesis that this power is the common nature lived and immediately experienced by the members of a group or community—"the collective emotion and activity of the group[2]." This common nature can, in Alexander's phrase, be enjoyed, but never directly contemplated. As unfathomable to introspection, it is termed by Jung the Collective Unconscious—the life-energy that in its spontaneous movement toward expression generates alike the hero figures of myth and legend and the similar figures that, appearing in individual fantasy, may overwhelm the personal consciousness.

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[1] *Op. cit.* p. 258.

[2] *Oxford Lectures on Poetry*, p. 84.

According to Bradley, the tragic exultation that we feel at the close of *Hamlet* is connected with our sense that the spiritual power of which Hamlet is in some manner the expression or product, is receiving him to itself. It would be this same sense that, as Bradley observes[3], demands, and is satisfied by, the words of Horatio, introducing, against Shakespeare's custom, the reference to another life: "flights of angels sing thee to thy rest." If, as I suggest, the spiritual power, which the philosopher analysing his poetic experience is constrained to represent, be conceived psychologically as the awakened sense of our common nature in its active emotional phase, then our exultation in the death of Hamlet is related in direct line of descent to the religious exultation felt by the primitive group that made sacrifice of the divine king or sacred animal, the representative of the tribal life, and, by the communion of its shed blood, felt that life strengthened and renewed. Hamlet, though he dies, is immortal, because he is the representative and creature of the immortal life of the race. He lives, as he desired to live, in the story with which he charged Horatio—and us who, having participated in that story, descend from the poetic ecstasy to draw breath again in the harsh world of our straitened separate personalities.

The insight of Nietzsche, who knew at once the intoxication of the artist and the analytic urge of the philosopher, discerned the essential nature of tragedy as a vision generated by a dance[4]. The dance of rhythmical speech, like the dance of the ancient chorus, excites the

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[1] *Shakespearian Tragedy*, p. 37.

[2] F. M. Cornford, *From Religion to Philosophy*, p. 87, Arnold, 1912.

[3] *Op. cit.* p. 147.

[4] See *The Birth of Tragedy*, Section 8.

Dionysian ecstasy wherein arises, serene and clear, the Apollonian vision of the imaged meanings the dancing words convey.

The painful images within the vision are at once intimately known and felt, and also 'distanced' like the objects in a far stretching landscape, 'estranged by beauty.' So far as the memory material used by the imaginative activity comes from personal experience, it has undergone "separation...from the concrete personality of the experiencer" and "extrusion of its personal aspects[1]"; but experience is also used which has never been connected with the personal self—as when, in *King Lear*, Shakespeare causes the actor to "impersonate Lear and the storm together[2]," and in the storm "it is the powers of the tormented soul that we hear and see[3]." Here, dramatist, actor and spectator are using experience which was never personal, but shaped through previous apprehension of physical storms into which was imaginatively projected that same impersonal emotional energy from which the daemonic figure of the hero is now fashioned.

To the impersonal, 'distanced,' vision corresponds, in Schopenhauer's phrase, 'a Will-free subject,' one indifferent to the aims and fears of the ego—not held to its private perspective[4].

This felt release, and Dionysian union with a larger whole, would seem to constitute that element of religious mystery—of purgation and atonement—traditionally connected with the idea of tragedy.

VII. Conclusion.

If now, summing up our results, we recur to the question: what determining emotional pattern corresponds to the form of tragedy? we may answer first, in accordance with our earlier discussion, that the pattern consists of emotional tendencies of opposite character which are liable to be excited by the same object or situation, and, thus conflicting, produce an inner tension that seeks relief in the activity either of fantasy, or of poetic imagination, either originally or receptively creative. The nature of the opposed tendencies that find relief through diverse renderings of the essential tragic theme, the death or fall of a hero, it is not easy to describe, at once with conciseness and adequacy. But we may attempt this through the concept of an ambivalent attitude toward the self.

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[1] E. Bullough, "Distance as an aesthetic principle," *Brit. J. of Psychol.* v (2), 116.

[2] Granville Barker, *Prefaces to Shakespeare*, p. 142.

[3] A. C. Bradley, *Shakespearian Tragedy*, p. 270.

[4] This character of the aesthetic experience is vividly expressed, in imaginative form, in the lines of De la Mare:

"When music sounds, all that I was I am
Ere to this haunt of brooding dust I came."

Here we have the felt contrast between the subject of the aesthetic experience—"all that I was I am"—and the self that is bounded in space and time by the bodily organism—"this haunt of brooding dust."

In the gradual fashioning and transforming, through the experience of life, of an idea of the self, every individual must in some degree experience the contrast between a personal self—a limited ego, one among many—and a self that is free to range imaginatively through all human achievement. In infancy and in the later years of those who remain childish, a comparatively feeble imaginative activity together with an undisciplined instinct of self-assertion may present a fantasy self—the image of an infantile personality—in conflict with the chastened image which social contacts, arousing the instinct of submission, tend to enforce. In the more mature mind that has soberly taken the measure of the personal self as revealed in practical life, there remains the contrast between this and the self revealed in imaginative thought—well nigh limitless in sympathy and aspiration.

Within what McDougall calls the self-regarding sentiment these contrasting images, and the impulses that sustain and respond to them, may bring about persistent tension. The experience of tragic drama both gives in the figure of the hero an objective form to the self of imaginative aspiration, or to the power-craving, and also, through the hero's death, satisfies the counter movement of feeling toward the surrender of personal claims and the merging of the ego within a greater power—the 'community consciousness.'

Thus the archetypal pattern corresponding to tragedy may be said to be a certain organization of the tendencies of self-assertion and submission. The self which is asserted is magnified by that same collective force to which finally submission is made; and from the tension of the two impulses and their reaction upon each other, under the conditions of poetic exaltation, the distinctive tragic attitude and emotion appears to arise.

The theme of the conflict between the generations—considered earlier, in relation to Hamlet and Orestes, as corresponding to an ambivalent atittude toward a parent figure—is plainly related to this more general theme and pattern; since, as we saw, the same underlying emotional associations cling to the images of father and of king. In experiencing imaginatively the conflict of the generations, the spectator is identified with the hero both as son, in his felt solidarity with the father and revolt against him, and again, when, making reparation for the 'injustice' against his predecessor, he gives place to a successor, and is reunited with that whole of life whence he emerged[1].

One or two points in regard to the argument may be briefly reviewed.

The question is sometimes asked whether the creative activity of the poet and the imaginative response of the reader are sufficiently alike, psychologically, to be considered together. In this paper I have been concerned primarily with imaginative response, and have not attempted to consider the distinctive activity of original composition. In so far, however, as the poet's work, *e.g.* a play of Shakespeare, does reveal his imaginative response to material communicated to him by others and by him to us, I have of course been concerned with the poet's experience.

The concept of racial experience enters the present essay in two ways: (1) all those systems or tendencies which appear to be inherited in the constitution of mind and brain may be said to be due to racial experience in the past. It is not necessary for our purpose to determine exactly the method of this 'biological inheritance' from our ancestors. Of more importance for our purpose is the question concerning (2) the racial experience which we may 'enjoy' in responding to that 'social inheritance' of meanings stored in language which also comes to us from our ancestors, and wakens into activity the potentialities of our inherited nature. In such racial or collective experience as we have discussed in relation to tragic poetry, so far as there is reference to an experiencer, this seems to be not an individual, but rather that larger whole from which what we know as the individual, or personal, self has been differentiated, and which remains with us as the sense, either latent or active, of a greater power.

In the present paper it is maintained that racial experience in this sense is an important factor in the total experience of tragic drama, at the present day, as in the ritual dance from which drama arose. In regard to this question further examination of the imaginative experience can alone be decisive.

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[1] Cf. the mystic saying of Anaximander, concerning the cycle of birth and death, wherein things "give reparation to one another and pay the penalty of their injustice," and the discussion of it by F. M. Cornford, *op. cit.* See especially pp. 8, 147, 176.

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To the Editor of the *British Journal of Psychology.*

Would Prof. Pear give us his reasons for preferring to use 'euphasia[1]' rather than 'verbal skill'?

I have to use the concept and have no difficulty in conveying my meaning by the words 'verbal skill': sometimes if my audience has little verbal skill, I define it by the phrase 'skill in the use of words.'

Surely it is better to convey one's meaning by the use of the words 'verbal skill' than to display one's verbal skill by the use of the word 'euphasia'?

Let us inspect the negative. Do not such substitutes as 'kakophasic' for 'verbally unskilled' imply a pathological delight in strange words to the detriment of the normal use of language, which is to represent objects to someone else as easily as possible?

The mere use of names derived from a dead language does not add to knowledge but often takes away the little some people might acquire by fostering the delusion that speech habits are in themselves knowledge of things. Certainly scientists often have to find new words for new concepts, and rightly reject popular words with many meanings already attached. But we have here a concept which is not confused by existing words. Although the words 'verbal' and 'skill' are in general use, their combination is sufficiently rare to be used according to one definition by scientists. The combination eminently fits the concept and there seems to be no sound reason for multiplying technical terms needlessly in this case.

Moreover, the proposed word 'euphasia' has been formed on analogy with 'aphasia'; now 'aphasia' means "loss of speech as a result of cerebral affection": it is not, therefore, a psychological but a physiological term. Similarly also dysphasia. Euphasia according to the analogy would be equivalent to "the physiological speech mechanism is O.K." Now it is the psychological speech mechanism that we are concerned with. A man may have perfect vocal organs and all the rest of the physiological speech apparatus, but he may stammer from fear, be lost for words out of ignorance, or say the wrong thing for a host of reasons that have nothing to do with physiology as such.

Finally, the word 'verbal' covers both the case of those who only speak and those who can only write their verbal descriptions, criticisms and directions of skilled movements. The term 'euphasia' would not cover the man who can *write* the best text-book of a sport. The term 'verbal skill' conveniently covers both vocal and scriptal forms of this ability.

On the grounds that it is a physiological term, an unnecessary term, and an inadequate term, I hope that we shall hear no more of 'euphasia' (except from physiologists) and yet much more of Prof. Pear's interesting researches into the varieties of verbal skill.

H. D. Jennings White.

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[1] This *Journal*, xx (4), 371.

PUBLICATIONS RECENTLY RECEIVED

Systematic Psychology: Prolegomena. By E. B. TITCHENER. New York: The Macmillan Company. 1929. Pp. xi + 278. 10*s.* 6*d.* net.

Everybody who knew Prof. E. B. Titchener agreed that his death was an exceedingly great loss to psychology. To many students who had not the pleasure of his personal friendship but who have wrestled with growing hopelessness with the immense detail of his Experimental Psychology, or who have tried in the laboratory to push through his meticulous introspectionism, it must have seemed that many of the things said then were somewhat exaggerated. If, however, they read this book seriously and carefully they will be inclined to agree that all of the tributes fall short of the real truth. Whether Titchener's attempt to characterise science in general and psychology in particular as a 'point of view' carries conviction is relatively unimportant. The book is delightfully written, a model of condensation, alive with learning and devotion. Here is to be seen a man of outstanding ability honestly trying to work out for himself what are the character and purpose of science in its varied expressions and scorning labour in the attempt. To Titchener science sets out to furnish the simplest possible description of the existential world and psychology pursues this aim in regard to sensorial material. Obviously the view rests upon assumption with regard to description, existence and sensation which many people will find it impossible to make or to accept. It also depicts the scientist as much more of a logician than a study of actual scientific procedure would seem to warrant. But in the course of his examination of the view adopted Titchener gives accounts of the work of Wundt, Avenarius, Brentano, Lipps, Meinong and Husserl which, in many respects, are far the best that have ever appeared in English. And not of these writers alone, but of a host of others whom he had studied with rare persistence and an honest attempt at understanding. It is refreshing to come across a book of this thoroughgoing seriousness and candour at a time full to overflowing of facile and superficial studies thrown up in the name of psychology.

The Foundations of Experimental Psychology. Edited by CARL MURCHISON. International University Series. Clark University Press (London: Humphrey Milford). 1929. Pp. x + 907. 27*s.* net.

No psychological library can afford to be without this book, and all serious students of psychology will gain much by studying it carefully. Criticism is easy enough and is, in a way, asked for in the brief Preface where the editor declares that problems not dealt with are ruled out as "promising little return from experimental effort." There is nothing specifically on attention (or, if people prefer the word, on 'attitudes'), perception, imagery and the higher mental processes. The whole conational side of psychology tends to receive only occasional sidelong glances; and perhaps some general indication could have been given of several of the promising applications of psychology to practical problems. Yet clearly not everything could have been included, and though on the whole the choice of topics seems to have been dictated by behaviouristic leanings, it is better to learn from what is included than to cavil at what is not. Naturally also, since each topic is dealt with by a different authority, there is some discrepancy of view and a great amount of variation in the value of the various contributions. For example, two of the most interesting chapters in the volume are Lashley's study of *Nervous Mechanisms in Learning* and Hunter's *Experimental Studies of Learning.* The first concludes that we want a more definite descriptive psychology to build physiological theories upon, and the second that we want more definite physiological investigation to build theories of learning upon. No doubt both may be true. The general level of the contributions is high and an immense amount of information is crowded into the pages of this volume. There are two English contributors: H. Banister who writes on Hearing, and H. Hartridge who deals with the physiological side of the same topic. Prof. Carl Murchison has once more done an extremely good turn to psychology by the enterprise and skill he has shown in organizing and publishing this book. He speaks in his Preface of succeeding editions. It is greatly to be hoped that the public demand for this book will render these speedily possible and profitable.

Instinct and Intuition: A Study in Mental Duality. By G. B. DIBBLEE. London: Faber and Faber. 1929. Pp. 394. 25*s.* net.

Mr Dibblee is already known to psychologists for his very interesting and lively study of *The Psychological Theory of Value.* Approaching a study of the principles of Demand in the realm of economics, he was led to a critical examination of the notion of Value. This, again, led him to consider how often the fully formulated judgments of reason are set aside, or overborne, by judgments based upon no consciously realized factors And this naturally and justly led him to take up his present problems in *Instinct and Intuition.* To Mr Dibblee instinct is a mode of intelligence on one side of reason, and intuition a mode of intelligence on the other side of reason. It is not very easy to disentangle from his general discussions brief and adequate definitions, but this is what he says: "Instinct is a mode of intelligence and its function is to act in judgment on sensations and to pronounce on their merit and validity." He regards instinct as "common to men and animals." "Intuition is a mode of intelligence unconsciously exercised by man only among the animals." With a wealth of reference and illustration the author elaborates these definitions, searching for the physiological basis of both intuition and instinct, and discussing in detail their probable interrelations. He has been very strongly influenced by the work of Sir Henry Head and Sir John Parsons. The physiological side of the book is certainly not its strongest part, but the volume as a whole is worthy of serious attention. It is well written and interesting throughout and is full of valuable ideas.

Pleasure and Instinct. By A. H. B. ALLEN. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1930. Pp. ix + 336. 12*s.* 6*d.* net.

This is a volume in the International Library of Psychology, Philosophy and Scientific Method. It is a very thorough piece of work, dealing with a wide range of problems. Sensory feelings are first discussed. It is maintained that "pleasure is the mental element which accompanies the sensations of the bodily processes when they proceed in a normal fashion." Ordinarily slight and almost unnoticed it may, within certain limits of organic activity, be greatly raised by special stimulation. Unpleasure occurs as the result of a conflict between the impulse, "towards exercise and enhancement of the vital activities, and tendencies towards the depression and stoppage of vital functions, when that conflict reaches a certain stage of acuteness." This theory is fully worked out, though without first-hand experimentation, and alternative views are considered and criticized. The third and chief part of the book discusses the relation of pleasure and unpleasure to the main instincts. The instincts considered are those of nutrition, of reproduction, of curiosity, of mastery, and of altruism. All normal progress of conative trends tends to be pleasurable, but frustration of instinct, provided the instinctive drive continues to operate, results in unpleasure. Sometimes the mere drop of an organism to a lower level of activity, organic or mental, itself gives rise to pleasure. There are no neutral feelings.

These are only a few of the many topics discussed. The book is a sober and serious contribution, not very lively to read and not containing any startling originality. Yet it makes a genuine effort to tackle extremely difficult problems, and it must be held to have succeeded very well indeed within the limits of its method. The author wields no tools of experiment, but he has obviously thought much and sincerely about his problems. He knows the literature well and presents both his own and opposing views fairly and clearly.

The Process of Human Behaviour. By MANDEL SHERMAN and IRENE CASE SHERMAN. London: Williams and Norgate, Ltd. 1930. Pp. 227. 12*s.* 6*d.* net.

In this book chapters III and IV, dealing with *The First Human Responses* and *The Relation of Sensori-Motor Development to the Growth of Intelligence,* and chapters V and VI, dealing with *The Observation of the Emotions* and *The Nature of the Emotions and their Influence upon Behaviour,* are very largely the outcome of first-hand experimental and observational work. They are clear and definite and, in particular, the chapter recording and photographically illustrating early emotional responses is an excellent piece of work. The first two chapters deal equally clearly with the growth of the nervous system and its functional significance. Here the authors have drawn upon sound authorities and have selected well, though naturally the major part of the story remains untold. The last two chapters discuss the development of personality, considered as a system of individual behaviour, and with the relation of personality to social behaviour. These are scrappy and slight, though they are consistent and in a general way full of common sense. The whole book is very easy to read, but is at the same time accurate as far as it goes.

The Influence of Habit on the Faculty of Thinking. By MAINE DE BIRAN; trans. by MARGARET D. BOEHM. Introduction by GEORGE BOAS. Psychology Classics, vol. III, edited by KNIGHT DUNLOP. London: Baillière, Tindall and Cox. 1929. Pp. 227. 22*s.* 6*d.* net.

Maine de Biran's essay has never been put into English before, but, in view both of its intrinsic merits and of the influence it has had upon French psychological thought, it is very justly included in this important series. The translation reads well and is good. The brief introduction by Dr George Boas is very much to the point, and adequately describes the setting of the essay. Of the essay itself it is unnecessary to say much here. It is full of acute and interesting observation and, in days when more and more psychologists are becoming preoccupied by problems of learning, it should receive the warm welcome which it deserves.

Adaptability to New Situations. By S. R. LAYCOCK. Baltimore: Warwick and York, Ltd. 1929. Pp. xi + 170. $2.40.

This volume (Educational Psychology Monographs, No. 26) gives a clear and readable account of a number of experiments carried out by the author under the direction of Prof. C. Spearman. The experiments were carried out upon school children, and their interest lies largely in their attempt to provide situations and problems attractive to the candidates, and in the way in which the problems set by the initial tests were followed up by further experiment in an attempt to get at their solution. All the results are interpreted directly in terms of Spearman's *Nature of Intelligence and Principles of Cognition.* Prof. Spearman himself contributes a foreword to this book.

Social Psychology. By BERNARD C. EWER. New York: The Macmillan Company. 1929. Pp. viii + 436. 10*s.* net.

There is a definite value in books of this kind, which do not pretend to be original contributions to a subject, but have as their aim the simple presentation of comparatively well-established material. It would serve admirably as a text book to use with a class beginning the subject; but it is unfortunately bulky, and the style is commonplace. The author has, however, with respect to many problems, a refreshing sanity. The book contains three parts of which the first deals with *Fundamental Principles,* the second with *Individuality,* the third with *The Social Order,* and the fourth with *Systems of Social Behaviour.* Questions and exercises are appended to each chapter.

Studies in Service and Self-Control. By HUGH HARTSHORNE, MARK A. MAY and JULIUS B. MALLER. New York: The Macmillan Company. 1929. Pp. xxiii + 559. 12*s*. net.

'Service' means working for other people instead of for oneself, while 'self-control' contrasts "the tendency to continue an approved act with resistance to the tendency to engage in an interesting but disapproved act." Both are regarded as important character traits and their study and, if possible, their objective assessments are pursued with the utmost enthusiasm by means of the application of a bewildering variety of tests. The authors and their subjects alike must have got a great deal of fun out of these tests, some of which seem to run to the extremes of ingenuity. The authors got a great deal more as well, and state their conclusions in this attractive but somewhat wordy book. The most important general conclusion is that any battery of tests which might properly claim to measure any single type of conduct must include a large number of tests representing a variety of life situations. The detailed conclusions are much too numerous to be summarized here: there are thirty of them relating to 'service' and another eight concerning 'self-control.' Taking it all in all, the volume is decidedly an attractive one, and represents an account of pioneer work which may well develop into a matter of great importance.

The Real Rhythm in English Poetry. By KATHARINE M. WILSON. Aberdeen: The University Press. 1929. Pp. vi + 171. 7*s*. 6*d*.

As every psychologist knows, the topic of rhythm has an immense literature. A large amount of this can be safely avoided, but this is a book that nobody who is interested in the subject should neglect. It is rather brilliantly written; it has important things to say, and it has the courage not only to propound a somewhat unpopular theory but also to illustrate it abundantly and with unfailing relevance. The general view adopted is that rhythm is not primarily perceptual, not mainly a matter of affective response; but above and beyond everything else an experience of movement. The particular attempt is "to collate the prosody of poetry with that of music." This attempt is made in so delightful and yet so terse a manner that further summarization could only spoil its force. The book is emphatically one that should be read and studied. Everybody with a lively enough mind and some interest in the topic will enjoy it, and whether he agrees with it or not will learn much from its study.

Nouveau Traité de Psychologie. Par GEORGES DUMAS. Paris: Félix Alcan. 1930. Pp. vi + 425. 74 fr.

This is the first volume of a proposed complete psychological treatise which is to cover the whole field of normal and pathological psychology. Seven volumes are projected to deal with normal, and two with abnormal, psychology. The general subjects of this first work are the neurological, biological and physiological bases of psychology, and a study of psychological methods. Each chapter is the work of a specialist in its subject. Thus: R. Perrier deals with *The position of man in the animal scale*; P. Rivet with *The data of anthropology*; Ch. Champy with *The physiology of age and sex*; Louis Lapique with *The general physiology of the nervous system*; Aug. Tournay with *The special physiology of the nervous system*; Henri Wallon with *The biological problem of consciousness*. On the methodological side the editor writes *An Introduction to Psychology*, which deals lucidly with some of the main historical sources both in an experimental and in a general sense; while André Lalande writes on *Psychology: its various aims and methods*. For the general student the book is overloaded with detail. For the teacher, or for the student who is beginning to research in any of the special fields dealt with, the volume will be of the utmost value. There are fairly good selected bibliographies to each chapter.

L'Année Psychologique, 1928. Vols. I and II edited by HENRI PIÉRON. Paris: Félix Alcan. Pp. xvi + 945. 240 fr.

L'Année Psychologique is nowadays chiefly valuable for its original articles. These are almost always of a very high standard and full of suggestions for new lines of work. The present volumes contain the following studies:

The problem of successive visual impression in relation to the perception of movement, by G. Durup; *A contribution to the study of the factors which regulate the rate of summation of luminous impressions from surfaces of varied luminosity in different regions of the retina*, by N. Kleitman and H. Piéron; *Internal inhibition of fixation*, by M. Foucault; *A French standardisation of the Barcelona test*, by Mme H. Piéron; *The problem of very brief tactile stimulation*, by A. Fessard; *The influence of the duration of sounds on their timbre*, by H. D. Bouman and P. Kucharski; *Temporal principles determining the chroma of luminous sensations*, by H. Piéron; *The language and 'articulations' of thought*, by D. Bertrand-Barraud. In addition there are notes on *Phenomena of contrast in the combination of heterogeneous fields in binocular vision*, by H. Piéron; *The influence of the composition of light on the nature of Benham's colours*, by H. Piéron, and a description of new visual apparatus and of a modified Mile's Pendulum, by the same author. The bibliographical analyses comprise 1380 titles, and in many cases, as usual, contain excellent brief critical remarks.

Introduction à la Psychologie Collective. Par CH. BLONDEL. Paris: Armand Colin. 1928. Pp. 211. 9 fr.

Dr Blondel is convinced that social psychology has a field of study which is peculiarly its own, and further that many of the problems of general psychology can be solved only by a more thorough recognition of the peculiar contributions that can be made to them by social studies. He writes this excellent little work to justify and clarify his view. The first part of the treatise describes the views put forward about social psychology by Comte, Durkheim and Yarde, while in the second part he shows how social factors may influence perceptual reactions, memory and the life of feeling.

Anfänge der Reifezeit, Ein Knabentagebuch in psychologischer Bearbeitung. Von W. STERN. Leipzig: Quelle und Meyer. 1929. S. vi + 125. M. 2.30.

This is the second edition of Prof. W. Stern's already well-known studies in the trends of human development during the early teens. It is a condensed but excellent and important contribution based throughout upon first-hand records and observations. After a brief explanation of his methods Dr Stern deals with his problems under three main heads: the changed attitude of the individual towards his own unique individuality, the new and developing reactions towards other people, and the widening fields of interest, all of which characterize the growth towards adolescence. Each problem is pursued in a number of special topics, and about them all Prof. Stern has something valuable to say. The book is one that merits wide and careful attention.

Geniale Menschen. Von ERNST KRETSCHMER. Berlin: Julius Springer. 1929. S. vii + 253. RM. 12.

Whether he agrees with Kretschmer's psycho-biological approach to the study of men of genius or not, every reader must admit that this book is one of strong interest. The first part of it deals with principles. Here are discussed that force often apparently from the outside, which may seem to impel the genius to expression; the 'drive' (*Trieb*) hidden in his own personality; the typical stamp of individuality which he possesses; his mode of disciplining his abilities, and the relation of genius to biological inheritance. The second part builds up a picture of the man of outstanding gifts in his various typical forms, the artist, the investigator, the hero and the seer. Many topics are here considered: periodicity of expression, the flowering of special gifts at particular ages, the character of inspiration. The third part of the book gives a number of extremely well-reproduced photographs of men and women of genius. Naturally all the interpretations are inspired by Kretschmer's special views about the psychology of types, but it is a thoroughly interesting book with a strong general appeal.

Die Psychologie der Productiven Persönlichkeit. Von Paul Plant. Stuttgart: Ferdinand Enke. 1929. S. 332. RM. 15.

This book casts a wide net. It is very largely historical, and is concerned on the whole more with ideas and principles than with concrete studies. Rather less than the first third is devoted to a study of views about genius and intelligence. The author begins far back by a consideration of mythological roots in the notion of genius, and then deals with the development of the notion, among the Greeks, at the Renaissance period, in rationalistic philosophy, in the English, French and German aesthetic of the eighteenth century, and in Lessing and Kant. A couple of chapters on genius and madness, and on a general critique of the notion of genius round off this part. Intelligence is treated much more summarily and by reference in the main to contemporary German work. Here full allowance is made for the parts played by character and temperament in the direction of intelligent adaptations. The bulk of the work is concerned directly with the *productive Persönlichkeit.* A general introduction describes some of the modern methods of the study of personality, and this is succeeded by a treatment of the whole psychology of the matter. Artistic creation receives specially detailed consideration, but law, natural science, history, religion and literature all get their share of attention. The third part of the volume is concerned with views expressed by contemporary outstanding German workers in science and in art upon their own methods of work. These were expressed in response to a *questionnaire* circulated by the author and are in many instances of great interest. The whole book is undoubtedly one which all students on personality studies will find it profitable to read.

Versuch über Fühlen und Wollen. Von Johannes Volkelt. München: C. H. Beck. 1930. S. 131.

The problems of this book are ancient and highly controversial. Prof. Volkelt writes about them with engaging brevity and much force. First he deals with *feeling*, dealing with what 'feeling' means in common speech; 'feeling' as *Tustandlicheits-Innesein*; 'feeling' in relation to pleasure-pain, 'feeling' in relation to organic sensation; the relation of feeling and conation and the phenomena of feelings which remain in a rudimentary or incompletely expressed state. The discussion of willing follows the well-known path: desire, wish, resolve and execution. Willing is considered both as a positive demand and as a negative attitude, and finally the consciousness of the imperative is considered. The last section deals with *Bewusstseinsletzeiten.* First this notion of 'enjoyment consciousness' is discussed and then its applications to emotional and cognitive phenomena are considered. The conclusions are summarized at the end of the volume.

A Hindustani Binet-Performance Scale: with a Comparison of the Intelligence of certain Caste Groups in the Panjab. By C. Herbert Rice. Princeton: Princeton University Press (London: Humphrey Milford). 1929. Pp. x + 196. 9*s.* net.

The Stanford-Binet scale, certain Otis tests and the American Army Alpha tests were translated into Urdu, and other tests from the U.S. Army Beta, the Pinkner-Patterson Performance scale and the Porteous Maze scale were similarly treated. The tests were tried and then modified for use in the Panjab. In Part I of the present book are published the scale as used, a list of instructions, tables of norms, and a list of materials. Part II gives the Panjabi modifications and the result of their application to 929 Panjabi schoolboys. In Part III there appear the results of a comparative study of boys from the 'depressed classes' with other major caste groups of the province. The work was evidently done very carefully and is exceedingly clearly presented, so that the volume forms a valuable contribution to comparative psychology. At the same time it is rather a pity that the author did not show himself more fluid in his attitude to the test material, and try the effects of *ad hoc* tests constructed with particular reference to the social backgrounds of the various groups dealt with.

The Child's Conception of Causality. By JEAN PIAGET. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1930. International Library of Psychology, etc. Pp. viii + 309. 12*s.* 6*d.* net.

Prof. Piaget here applies his well-known method to an investigation of the child's views concerning: (1) explanation of movement; (2) prediction and explanation; (3) the explanation of machines. A final section sums up Piaget's beliefs concerning the nature of children's thinking with special reference to the conceptions of reality and causality. A large number of concrete topics are discussed, *e.g.* experiments concerning the nature of air; the origin of wind and of breath; the movement of the clouds and of the heavenly bodies; water currents and movements due to weight; the child's idea of force; the floating of boats; the level of water; the problem of shadows; the mechanism of bicycles; the steam engine; trains, motor-cars and aeroplanes. The general conclusion that children's thinking is in many important features essentially different from the adult's remains the same as in Piaget's earlier volumes. And once again the author has produced an original study of great interest and importance, rather diffuse in style, and rather biassed by the uncritical acceptance of current views with regard to the modes of thought of most grown-up people.

Problem Tendencies in Children. By W. C. OLSON. University of Minnesota Press. 1930. Pp. xi + 92. $2.00.

This is largely a study in method. Dr Olson and his collaborators keep two types of record for all the children whom they study. The first tabulates specific overt acts of misbehaviour, the second a rating of personal traits by an observer who is skilled and appears trustworthy. These two records are then related statistically and the final score serves as a "problem tendency indicator." It is perhaps not surprising that the author found that probably "all children are problem children, but that they are so in varying degrees." However, as an interesting bit of pioneer work, the monograph is of value. The methods used are carefully described so that they can be applied by any reader, and the results so far secured are candidly set forth and discussed.

The Language Development of the Pre-School Child. By DOROTHEA A. MCCARTHY. University of Minnesota Monograph Series, No. IV. 1930. Pp. xiii + 174. $2.00.

Records were kept of the running conversation of 140 pre-school children of Minneapolis. These were studied from the point of view of the length of the responses, their functions, their construction, and their expression in parts of speech. The result is an undeniably valuable contribution to the topic of language development in the child. An account is given of earlier work, and there is some discussion of general problems. The presentation is throughout clear-cut and definite, and the whole work deserves much praise.

The Process of Learning. By CONSTANCE BLOOR. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1930. Pp. vii + 279. 7*s.* 6*d.* net.

The sub-title of this book runs: *Some Psychological Aspects of Training and Discipline in School,* and the volume is addressed primarily to Training College students. Written in a simple and lucid manner, it gives an excellent account of learning processes, both on their more technical sides and as regards general character training. The book makes no particular pretence to be original, but it is capable and should admirably fulfil its purpose.

The Teacher's Many Parts. By Sir JOHN ADAMS. University of London Press. 1930. Pp. 362. 6*s.* net.

The book contains twenty lively short essays about how a teacher may come into touch with the public, with the school, and with himself. The essays—which have such titles as: *The teacher* as *human being,* as *psychologist,* as *disciplinarian,* as *humorist,* as *scholar,* to take a few at random—contain much wit, no small amount of good advice, and a deal of excellent observation and common sense. They are eminently easy to read, a little bit 'superior' at times perhaps. They will certainly entertain the teacher, and even more, perhaps, his scholars; and, as they can hardly fail also to do the teacher good, it is to be hoped that they will be read widely.

Animism, Magic and the Divine King. By GERGA ROHEIM. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1930. Pp. xviii + 386. 21*s*. net.

The topics dealt with in this book are (1) Animism and the Other World; (2) The Psychology of Magic; (3) The Medicine-Man and the Art of Healing; (4) The Divine King; (5) The Scapegoat. Under these heads a very large number of customs come up for review. The problems are various but the solution is always the same: primitive society and everything in it is organized on a basis of castration anxiety, and the whole history of humanity is a succession of phases of genital organization followed by a flight away from this, followed by a further recoil that lands humanity in some form or other of its 'primal phase' again. The number of phallic symbols and substitutes that appear in this book is absolutely dazzling, and the discussion may be cordially recommended to anybody who desires to appreciate the dogmatic lengths to which this sort of interpretation can go.

Die Psychologie der Schizophrenen und ihre Bedeutung für die Klinik der Schizophrenie. Von CARL SCHNEIDER. Leipzig: Georg Thieme. 1930. S. xi + 301. M. 23.

This is a detailed and pretty well documented study of dementia precox. The first part deals with behaviour symptoms, the second offers a detailed analysis of the clinical picture of the disorder, and the third discusses practical problems of importance in general treatment.

Therapy of Personal Influence. By EDWIN HOPEWELL-ASH. 1929. Published privately at BM/ELHA, London, W.C. 1. Pp. 96.

This little practical book is intended solely for the use of the medical practitioner. It gives clear and simple instruction in the carrying out of certain psychotherapeutic methods. The author very properly stresses the importance of the personality factor in regard to method of treatment, and gives a number of case studies. The descriptions of what the writer calls the method of "personal influence and suggestion" are adequate, so that they could be readily followed by anybody. But the accounts of hypnosis and of 'psychomagnetic methods' are too scrappy to be of much service. And, what is a much more serious blemish, the book shows no appreciation whatever of the psychology which underlies all suggestion treatment.

The Constitutional Factor in Disease. By ARTHUR F. HURST. London. 1927. Pp. 93. *The Troubled Conscience and the Insane Mind.* By CHARLES BLONDEL. London. 1928. Pp. 91. *Medicine and the Man.* By MILLAIS CULPIN. London. 1927. Pp. 67. *Hypochondria.* By R. D. GILLESPIE. London. 1929. Pp. 104. All published by Kegan Paul, Trench, Trübner and Co., Ltd. in the Psyche Miniature Series. 2*s*. 6*d*. net each.

Dr Hurst's essay is primarily of interest to the medical student and practitioner, but psychologists who are concerned with questions of temperament may find in it some relevant material. Dr Charles Blondel's two essays are preceded by a vigorous introduction by F. G. Crookshank. Broadly Blondel's thesis is that all goes well when a man can directly formulate his experiences, but that in insanity or in some forms of psychological disease the verbal formulations all get tacked on to the wrong experiences. The case is put clearly and persuasively but, so far as these essays go, in general terms only. Dr Millais Culpin's essay is admirable for the general reader, and also should serve well to forewarn the medical student of the value of a psychological point of view. His two chapters on *What is a neurosis?* and *What is behind the neurosis?* should be widely read. Finally Dr Gillespie writes in an engaging manner about hypochondria, the history of its study and treatment, its symptoms, and its psychopathology.

Critique of Love. By FRITZ WITTELS. London: George Allen and Unwin, Ltd. 1930. Pp. viii + 313. 12*s.* 6*d.* net.

The author regards this as an 'original study' in the application of psychoanalysis to love. After a brief but interesting account of the way in which Freud arrived at his methods and views, Mr Wittels takes up a number of different topics and tries, in a not unfamiliar way, to show how love motives may lie behind an immense diversity of human conduct. In the course of his discussions he deals with sex deviations, masked sadism, bisexuality, narcissism, parents and children, *le grand amour*, great haters, love and marriage and the childwoman. The writing is in a popular vein throughout, with many illustrations. In point of fact the volume is not really very original except in its application of well-known principles of explanation to new instances. The instances, also, though new in detail are of the type that have been dealt with in this way many times already.

The Psychology of Religious Adjustment. By EDMUND S. CONKLIN. New York: The Macmillan Company. 1929. Pp. xiv + 340. 8*s.* 6*d.* net.

This is a quiet and in many ways unusually helpful study of psychological reactions in the religious realm. All the usual questions are discussed and particularly in the study of various forms of religious exercises there is considerable successful attempt at first-hand concrete study. The author is well acquainted with the literature of the subject and can be relied upon for a sane and considered judgment. He is also successful in maintaining a properly psychological point of view throughout.

The Pathetic Fallacy. By LLEWELYN POWYS. London: Longmans, Green and Co. 1930. Pp. 129. 5*s.* net.

This is not a psychological book. It is a delightfully written and produced brief history of Christianity from its origin to the present day. The author is appreciative, but sees Christianity as "a dream that has taken possession of the human imagination for two thousand years....Something of it will remain for all time, mystical and persuasive like the smell of summer rain on a parched garden plot. The religion as we know it will surely drift out of our thoughts." It would be interesting to know a little more about what will remain, but here Mr Powys is not very definite.

Man and the Image of God. By H. M. FOSTON. London: Macmillan and Co. 1930. Pp. vii + 228. 7*s.* 6*d.* net.

On the face of it it would hardly appear that this book could have much to do with psychology. But Dr Foston is obviously well-read in and appreciative of the more theoretical sides of the subject and his treatment throughout has much of psychological interest. In the beginning it is based, rather dangerously, upon an analogy between the Doctrine of the Trinity and the conventional tripartite classification of ultimate mental reactions into knowing, feeling and striving. That the validity of the latter should strengthen belief in the former demands, obviously, other assumptions which not everybody will be willing to make. The author is not unaware of this and, in what he calls 'Critical Review,' attempts further justification of his view that man inevitably bears in his nature the "image of a transcendent Triunity." In the rest of the book he works out what he regards as the consequences of this position, especially in regard to the Creation (*i.e.* the general outer environment), the Incarnation, and the place of Love in the universe. Whether the whole essay is regarded as in any way convincing or not, it is a valiant constructive effort, and a psychologist with some imagination and a *flair* for speculation will enjoy its reading.

Five Types of Ethical Theory. By C. D. Broad. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1930. Pp. xxv + 288. 15*s.* net.

The five types dealt with are represented by the theories of Spinoza, Butler, Hume, Kant and Sidgwick. Dr Broad gives brief biographical details of each of these, and then in turn submits their theories to his most searching and critical examination. Naturally there is a good deal of psychological argument in the course of the book, as in the sections dealing with psychological egoism, conscience, psychological hedonism and the like. This is all extraordinarily clear and decisive. To Dr Broad no one of these five types is wholly satisfactory, and his general conclusion is that the whole subject of human desire, emotion and action is one of extreme complexity, and that man is in a paradoxical position "half animal and half angel." To this, no doubt, the psychologist will assent without difficulty. It would, however, be most unfair to suggest that this is the sum of the whole matter. The destructive criticism is often lit by brilliant positive suggestions, and in his final conclusions Dr Broad puts forward several notions which justly demand much further study. Especially the distinction between the total goodness *of* the community and total goodness *in* the community is one which every social psychologist will want to know much more about.

Let whoever reads this book study also the Index.

Mind and the World-Order. By C. I. Lewis. London: Charles Scribner's Sons. 1929. Pp. xiv + 446.

This exceptionally able and well-written book contains much that will repay the serious study of every epistemologically inclined psychologist. Naturally it is largely concerned with problems in the perception of external objects and with an appraisement of scientific concepts. Its bent is throughout constructive. The author, perhaps a little unfortunately, labels his view 'conceptualistic pragmatism,' but, as he himself remarks, most pragmatists would give it only a very qualified allegiance.

Your Character from your Handwriting. By C. Harry Brooks. With a foreword by Robert Saudek. London: George Allen and Unwin, Ltd. 1930. Pp. 159. 3*s.* 6*d.* net.

The contents of this book are sufficiently indicated by the title. It is a popularization of the work of Saudek, and contains numerous illustrative examples.

Some Aspects of Hindu Medical Treatment. By Dorothea Chaplin. London: Luzac and Co. 1930. Pp. 71. 3*s.* 6*d.*

This brief monograph, which is largely concerned with methods of psychotherapy, may be of some value to students concerned with comparative psychology. The accounts are mainly at second hand through the teaching of Mr S. M. Mitra. It goes without saying that the methods described must not be applied indiscriminately by persons having no general medical training.

The Nature of Consciousness. By E. R. Rost. London: Williams and Norgate. 1930. Pp. 158.

The author hopes that his work will help to bring "the study of Psychology within the range of Science." As a matter of fact it will be totally incomprehensible to any reader who is not well versed in Buddhistic ideas and willing to accept them without criticism.